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Ophthalmic Hospital Reports

AND JOURNAL OF THE

ROYAL LONDON OPHTHALMIC HOSPITAL.

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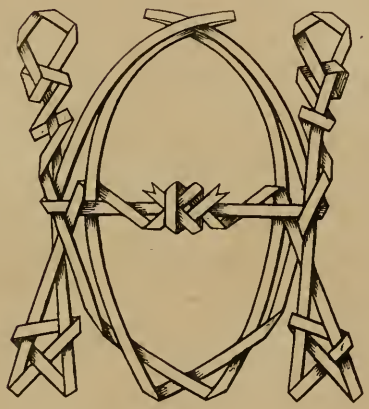

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and Journal of

Ophthalmic Medicine and Surgery.

Vol. VI. Part 1. 1867.

Part I.

Original Contributions.

OPHTHALMIC MISCELLANIES.

By Wm. Bowman, F.R.S.

No. 2.—*Cases of Zoster, or Unilateral Confluent Herpes, of the Ophthalmic Region.*

(For abbreviations, see ante, vol. v, p. 1.)

Cases of this nature have attracted my attention during many past years. The following extracts, drawn up by Mr. Rogers from my case books, are offered for the additional light they may throw on the clinical history of an affection not very much known. In connexion with them I must refer to a graphic description in the clinical lectures of Trousseau ("Clinique Medicale," 2nd edit., t. 1, pp. 192—8), and to an excellent paper by Mr. Hutchinson in the Ophthalmic Hospital Reports, vol. v, p. 191.

I have frequently seen this disease mistakenly called "erysipelas," even by accomplished practitioners. From this it is distinguished by the pain preceding the eruption, by the mingled numbness, pain, and heightened sensibility

remaining for a long period after the inflammatory outburst, and especially by its not overpassing the median line. As the nerves of sensation certainly play an important part in zoster, and the fifth is an eminent example of this system of nerves, its distribution special, and accurately known, the local form we are now considering is of peculiar interest, furnishing, probably, the one example wherein its very remarkable features may be most advantageously studied.

Zoster seems to be a peripheral disease, having its primary seat in branches of the nerves of common sensation. Probably these nerves, often from cold, become inflamed in the more superficial portion of their trunks, and in their distribution up to their ultimate network, whereupon the eruption succeeds as the result of an extension of vascular excitement to the cutaneous tissues anatomically related to this network. This view enables us to understand the pain and tenderness present in the part (usually for some days) before the skin reddens or the clusters of vesicles appear. It may explain the long-continued, sometimes lasting, alteration of sensibility in the whole region of the distribution of the affected nerve-branch, even in parts where the actual eruption may have failed to appear.

That peripheral excitement of sensitive nerves originating in a central or reflected source may induce tenderness and redness in the region of such nerves is sufficiently well known. In ophthalmic practice it is common, when an eye is intensely affected with inflammatory pain, especially if with intraocular tension the ciliary nerves are compressed or stretched, to have the whole of the same side of the head, even to the occiput—sometimes the opposite side in a less degree—not only the seat of acutest pain, but also highly sensitive to the touch, such tenderness only gradually subsiding after its cause has been relieved by (perhaps) iridectomy for glaucoma, or by excision of the globe. I have not seen zosteric eruption

thus induced, but there is an evident analogy between the two states.

Parts of the Eye Affected.—It is not always possible to examine the eye accurately during the herpetic attack, owing to the swelling of the lids; but when this subsides, it is usually easy to ascertain what tissues have suffered. I have seen nothing like herpetic eruption on the conjunctival surface of the lids or globe. The conjunctiva may be too red, the eye may be watery and intolerant of light, and the peculiar pain of the affection may be experienced in, or referred to, the organ itself; but usually there is no primary disease, such as corneal or iritic inflammation, coincident with, or forming a part of, the eruptive stage of the complaint. If these occur, they seem rather to follow after a short interval. Small softenings or ulcerations of the cornea, rather marginal than central, and slight iritis, are the more common complications, but rather the former than the latter, and they have seemed to me to bear considerable resemblance to those following small-pox, both in their course and the treatment they demand. This should be of a soothing or supporting kind, the lids being kept closed, and time being patiently allowed for the necessarily slow process of healing under natural influences. I have not found affections of the eye-ball to occur specially in those cases of ophthalmic zoster in which the eruption followed the course of the nasal branch.

Treatment of the After-pains.—I wish I could state anything very satisfactory as to the treatment of the after-pains, which are sometimes so severe as to make the patient weary of existence.

In Case IV., subcutaneous division of the nerve was only undertaken after almost all other remedies, local and general, had failed. It certainly for a time took away all feeling from the region to which the frontal nerve is distributed; and when touched in this region, the patient no longer experienced the pains which previously tormented

him. But in a few weeks the sensibility had returned, and even at first the pains in neighbouring parts to which the remedy had not extended seemed such as to make the partial relief very little appreciated. It may be also that the morbid condition of the nerve on which the pain depended was not confined to the part peripherad of the point of section, and that the central portion continued the seat of pain. Perhaps if it had been possible to divide the nerve further back, the relief would have been greater.

In Case VI., very marked relief did follow section of the nerve, and with clear evidence of the fact. When the frontal nerve was divided, the frontal pain was greatly lessened. When the external nasal branch was cut, pain was no longer referred to the skin of the nose, while the inner surface of the nostril contined to be the seat of distressing pain, and I could think of no way of dividing the inner branch entering the nostril far back through the ethmoid. The relief, so far as it extended, was in this case so permanent and considerable as constantly to elicit the patient's thanks. The result in this single case would incline me to recommend the division of the nerve, a very harmless proceeding under chloroform, whenever the after-pains are severe and continous in spite of time and other treatment.

Trousseau says, op. cit., p. 197, "I have known an old lady who, at 70, had shingles, and who, for 14 years afterwards, still suffered the most terrible pain, especially at night. Now I have under treatment a lady of 60, who for five years has been terribly tormented by the pains of herpes. I have noticed several times a singular phenomenon: the simple contact of the clothing often provokes the most unspeakable torture, and yet the skin has superficially a kind of insensibility, which lasts often long after the pains have ceased." Surely when the nerve of such parts can be reached, it must be worth while to annul its function by cutting it across.

CASE I.—*Herpes r. forehead, with Nebulous Cornea.*

Oct., 1855. Miss B., aged 40, had had herpes on the right side of the forehead in the previous June, attended with ophthalmia of the right eye, dimness of the cornea, and severe pain of a rheumatico-neuralgic character. The affection was attributed to exposure to cold winds. When seen, the right cornea was nebulous, with a streak of lead-deposit in the centre.

CASE II.—*Herpes r. forehead, with Nebulous Cornea and Iritis.*

July, 1856. Miss W., aged 57, had suffered for three years from severe inflammation of the right eye, which had left a slightly nebulous cornea. She had muscæ, flashes, and periods of temporary blindness.

She was not seen again until April, 1866, when she brought a history of confluent unilateral herpes of the right side of the forehead, in 1860, of which large scars remain. She has suffered from neuralgia of the right side of the head, eye-brow, lids, and in the eye, since the attack of shingles.

The right eye was T1, there was a dense buff nebula occupying nearly the outer half of the cornea; there were numerous adhesions of the iris to the capsule of the lens, lens clear or nearly so—Pr. $\frac{1}{10}$ and Hm. $\frac{1}{16}$. She could read J8 with $\frac{1}{10}$ and, with $\frac{1}{16}$, Snellen 70, at 10′. She had used convex glasses for thirty years. Left eye Tn., posterior synechia, pupil almost closed, no reflex from the fundus, only perception of light.

CASE III. *Herpes l. forehead, with int. Strabismus of l. and Diplopia.*

Mr. W., aged 36, was seen in March, 1858. He had had a consumptive tendency for three years. On two occasions diplopia had occurred for six weeks, and then ceased. At this time he had diplopia of four months' duration, following an attack of "erysipelas" (shingles), which had left cicatrices on the left brow, and a sensitive state of the skin. Diplopia horizontal, right image formed by right eye, and faint, the two images a foot apart at 12′. Giddiness with each eye constant. The eyes appeared straight, but the left had a slight tendency to internal strabismus, on looking to the right.

March 18, 1859. Soreness and numbness of the skin have

continued. The diplopia has increased, and there is decided internal strabismus. He always walks with one eye closed, on account of the double vision.

Division of internal rectus was suggested, but not acceded to.

CASE IV. *Herpes l. forehead and scalp, with Conjunctivitis. Division of Supra-orbital Nerve.*

Mr. L., aged 70, was first seen in May, 1862, when he had some dimness of the left eye, caused by faint striæ in the lens.

On Nov. 7, 1865, he came again with the following history sent by his medical man. In the previous July, he had one day intense pain in the right eye and forehead, followed on the next day by a spot of herpes in the centre of the forehead. In a day or two the inflammation spread to the neighbouring skin, and soon advanced over the entire right half of the scalp. The disease was considered a combination of herpes and erysipelas. Blisters formed wherever the mischief wandered, and the whole of the right half of the scalp was raised by a bluish sanious fluid. Under a liberal diet, and wine, and quinine, he slowly recovered. As the eruption disappeared the skin was found numbed, and hardly sensitive to the touch, but this condition was soon succeeded by extreme hyperæsthesia, and very intense neuralgic pain. As convalescence advanced, the conjunctiva of the right eye became inflamed. He had in October an attack of gout which for the time gave relief to the eye. On his visit in November, the skin on the side of his forehead and vertex was extremely sensitive to the touch, cold, heat, &c., and he had almost constant neuralgic pain. The cornea was clear, and the conjunctiva hardly affected. The forehead was covered with scars.

Embrocations and hypodermic injections caused no relief, but some ease was given by wearing a cap of cotton-wool.

May 9, 1866. Still constant pain. Sleeps badly, and does not bear opiates. Sensitiveness of skin very great. 16th. Supra-orbital nerve divided subcutaneously as it emerges from the orbit. There was hardly any external bleeding. 17th. Considerable ecchymosis of the upper lid, good night, without neuralgia. 19th. Still pain in side of temple and nose, but ex-

presses himself relieved since the operation. The last account received (in December) reported very little improvement, as resulting from the operation.

CASE V.—*Herpes l. cheek and temporal region, with Atrophy of the Optic Nerve.*

May, 1864. Mr. D., aged 44, was attacked in January last with inflammation of the side of his face, which was considered as erysipelas. It occupied the left half of the face, as far down as the level of the lobe of the ear, but not the ear itself, nor the nose, except about the bridge, it extended also to the left temporal region, and for a short distance above the brow—nowhere else. In ten days it had reached its worst, and for three weeks he was very ill, with much swelling of the left lids, and great pain. When the swelling subsided, the left eye was found to be blind. At the end of five weeks, when the face was well, the right knee became much inflamed and swollen—it is now $2\frac{1}{2}$ inches more than its fellow in circumference, and has been in a plaster of Paris bandage for six weeks.

Now, left upper lid tumid, and half open. Movements of the globe normal—no paralysis of the third nerve—left globe, Tn, pupil dilated, and acts only with the right retina, no perception of light—OS. clear, od. white, arteries and veins small.

Right eye perfectly good. Sensation perfect on skin everywhere.

CASE VI.—*Herpes l. side of head, cheek, nose, and lids, with Nebulous Cornea.—Division of Supra-Orbital and Infra-Trochlear Nerves.*

Samuel H., aged 55, a sailor, came to Moorfields in May, 1866. The right eye had been blind 18 years. Sight failed gradually, during a voyage to Hobart Town, without pain or inflammation. Tn. OS. atrophy of the optic nerve. In November, 1864, he was seized with violent pain shooting through the head, followed by inflammation of the left side of the head, with swelling and great pain of the left brow and cheek. It was said to be erysipelas. He was in the hospital at Point de Galle, Ceylon, for twelve months, the inflammation lasting about five months. Ever since, he had had a numb feeling of the left side

of the head, cheek, and side of nose, with great soreness to touch—hyperæsthesia—could not bear a brush to his hair. He had frequent darting, shooting pains in the left temple and side of the head. There were white scars, not deep but well-marked, on the skin of the left forehead, on the side of the nose, and on the upper and lower lids. The palpebral conjunctiva had cicatrices from old granulations. Cornea, nebulous on the lower part, and facetted about the apex. Tn. J16.

Mr. Bowman passed a broad cutting needle under the skin above the the left brow, and divided the supra-orbital nerve. A compress was applied, and there was hardly any bleeding. The operation was followed by relief from the extreme sensitiveness of the skin of the forehead, but the pain in the vertex and side of the nose continued. A fortnight afterwards, the branches of the infra-trochlear nerve were divided, and also an artificial pupil made outwards in the left eye. The pain in the skin of the nose was relieved at once, and in a few days he left the Hospital.

Sept. 28. He has continued free from pain in the temple and side of the nose, and the pain of the vertex is much lessened. The inner surface of the left nostril is extremely sensitive to the touch, and often gives him a good deal of pain. Vision, generally, improved by the artificial pupil.

Nov. 13. There is now no pain in the vertex, nor on the outside of the nose, but the inner surface continues very sensitive. He is looking greatly improved in health. He can see J12. As he is hypermetropic $\frac{1}{24}$, he wears a glass of that power, and is enabled to get about and do a little work at the Sailors' Home, of which he is an inmate.

Case VII.—*Herpes r. forehead, with Nebulous Cornea.*

July, 1866. Miss S., aged 60, had two years ago severe pain over the region of the first division of the fifth nerve, followed by confluent herpes of the forehead. She suffered extremely for three or four weeks, but was somewhat relieved by blisters behind the ears. Numbness and hyperæsthesia of the skin have remained ever since to the present time. There are patches of cicatrix above the brow, and an uneven nebulous state of the upper part of the cornea. She has frequent attacks of neuralgia also, on the right side of the head.

CASE VIII.—*Herpes r. forehead. and Infra-Orbital Region, with Iritis and Ulcer of Cornea.*

Oct., 1866. Mrs. S., aged 52, came on October 27th, with the following history, kindly given by Mr. Kelson Wright, her medical attendant.

On Sept. 28th, she had been seized with severe pain over the right brow (like clavis hystericus), accompanied with lacrymation and photophobia.

On the fourth day after, October 2nd, several patches of herpes appeared between the right brow and the root of the hair, extending to the median line in one direction, and to the middle of the temple in the other.

On the 4th a zonular redness was noticed round the cornea. The pain over the brow was very severe.

On the 6th, there was great photophobia, and the pupil was seen to be irregular.

By the 12th the patches of herpes were nearly well, but the pain continued, being much aggravated at night.

On the 20th the cornea appeared rough and hazy, sight was much impaired. The burning, stinging pain in the brow continued.

On the 27th, when Mr. Bowman first saw her, the eye was less inflamed, but the photophobia and pain remained. The cornea was clear, but at the inner and lower margin, for about $\frac{1}{4}$ of the circumference, there was an abrupt deepish ulcer. The pupil, under atropine, showed several adhesions of the iris to the capsule of the lens. The conjunctiva was a good deal injected. Tn. There were marks of the herpetic eruption over the right forehead, and a small patch over the infra-orbital foramen; none on the nose. The skin of the forehead was very painful and tender to the touch, and the patient had been suffering severely from neuralgia, especially at night, so much so that she had hardly had a night's rest during the month. She stated that she was liable to free perspiration, and attributed the attack to exposure to cold wind during a profuse perspiration. A hypodermic injection of morphia was employed that evening, after which she slept well, and continued free from pain the following day.

On the 29th the pain returned, but to a less degree.

At the latest report (Dec. 21st), the cornea was quite clear; no trace of ulceration remained. The only complaint was of irritation when warm, or near the fire, in the spots where the eruption had been; and the skin continued of a dark colour, but free from scars.

Case IX.—*Herpes r. forehead and eyelid; Globe not implicated.*

Edward H., aged 70, was seen in December, 1866, when he stated that five weeks previously he had severe pain on the right side of the head, followed in a fortnight by an eruption over the corresponding side of the forehead. This was accompanied by tingling and numbness of the skin. These symptoms increased for about three days. The right lids were a good deal swollen, and the sight a little dim. His general health was very good. At the time of his visit the eruption had disappeared, but dark brownish scars remained, occupying the right side of the forehead, temple, and upper eye-lid, the great force of the herpetic attack seemed to have been expended at the commencement of the frontal nerve, where the scars were deeper and darker, and it seemed to have diminished in violence as it followed the distribution of the nerve. The eruption was limited accurately by the middle line of the forehead, and spread upwards amongst the hair to about the fronto-parietal suture, and laterally over the temple. The skin was numb to the touch, and at times, especially at night, the seat of tingling and smarting, relieved by the application of warmth. The pain had not been very violent, except at the outset of the attack. The right side of the nose also was numb, although there had not been any eruption on it. The sensation of the rest of the face was normal. His vision was unaffected.

Feb., 1867. Numbness continues, and tingling at times at night, now aggravated by heat. Slight tinea of upper lid.

This case is illustrated by the annexed photograph, taken by Mr. Ernest Edwards about six weeks after the attack.

Ernest Edwards, 20, Baker Street, W

SCARS AFTER HERPES FRONTALIS.

No.	Sex.	Age.	Side.	Region.	Nerves.	Pain or Numbness.	Complications.
1	F.	40	R.	Forehead.	Frontal.	Neuralgia, severe.	Ophthalmia and corneitis, right eye, leaving nebula.
2	F.	57	R.	Forehead.	Frontal.	Neuralgia, six years at least.	Corneitis and iritis, right eye, leaving dense nebula.
3	M.	36	L.	Forehead.	Frontal.	Hyperæsthesia and numbness.	Internal strabismus of left eye, with diplopia.
4	M.	70	R.	Forehead and scalp.	Frontal.	Intense neuralgia, hyperæsthesia and numbness, lasting.	Conjunctivitis { In this case the supra-orbital nerve was divided, with no material permanent relief.
5	M.	44	L.	Cheek, temple, and brow.	Sup. maxillary and frontal.	Great pain, not lasting.	Atrophy of optic nerve, left eye.
6	M.	55	L.	Head, cheek, nose, and lids.	Frontal and nasal.	Darting pain, hyperæsthesia, and numbness.	Corneitis, leaving nebulæ, left eye. { In this case the supra-orbital and infra-trochlear nerves were divided with considerable relief.
7	F.	60	R.	Forehead.	Frontal.	Neuralgia, hyperæsthesia, and numbness, lasting.	Nebulous cornea, right eye.
8	F.	52	R.	Forehead and infra-orbital region.	Supra-orbital and infra-trochlear.	Hyperæsthesia and neuralgia, not lasting.	Ulcers of cornea, iritis, right eye.
9	M.	70	R.	Forehead, temple, and upper lid.	Frontal.	Numbness and tingling pain.	Thickening of lid, globe not affected.

REPORT ON CASES OF CYSTS IN THE IRIS.

By J. W. Hulke.

Two cases of cyst of the iris have lately come under my observation at the hospital. One of them, which was under my own care, presented an unusual feature in being pedunculated, a circumstance which permitted the more than ordinarily complete removal of the cyst, and afforded me a very favourable opportunity of examining its minute structure. The case is as follows :—

I.—A little boy, five years old, pricked his eye with a fork. His mother thought that this had not hurt the sight. Nearly two years afterwards the eye, which meanwhile had remained quiet, became red and weak, and it was then found that he could scarcely see with it. The other eye soon became irritable, and his mother, about three months after the accession of these symptoms, brought him from Faversham to the Royal London Ophthalmic Hospital for advice, January 9th, 1867.

There was now a cyst in the anterior chamber wedged between the cornea and iris. It had a flattened oval figure; the larger end corresponded to a minute, inconspicuous scar at the temporal border of the cornea; and the smaller end partly overhung the pupil, which was contracted and circular. Towards the margin of the anterior chamber, the iris receded from the cornea, at each side of the cyst, as if pushed back by it. The cyst was so transparent that through its anterior wall two small black spots were seen in its posterior wall, in the plane of the iris; and from the edges of these spots, which could not be anything else than the uveal stratum of the iris, delicate fibres were observed to arch forwards over the front of the cyst. These fibres evidently belonged to the muscular stratum of the iris. Between the black spots and the pupil the iris was distinctly visible through both walls of the cyst, and its integrity in this situation appeared perfect. These data established two things, first, that the cyst had originated in the iris between its uveal and muscular strata; and, secondly, that it was not conterminous with the whole extent of iris covered by it, but that it

had only a limited attachment to the iris at the black spots. There was a slight degree of serous iritis in this eye, and there was sympathetic irritation in the other. The visual acuity of the injured eye was less than could be accounted for by the iritis and the obstruction of the pupil by the overhanging cyst, the reason of which was not immediately apparent.

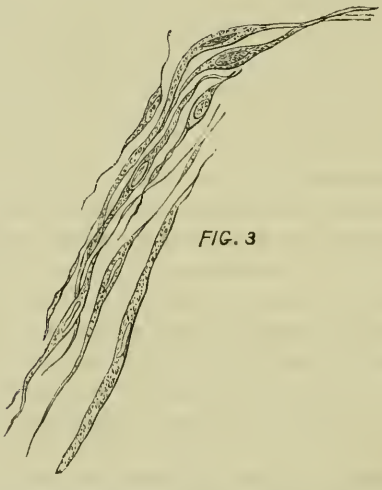
The inflammation provoked by the growing cyst demanded instant relief. The choice of measures lay between simple puncture and incision, or rather evulsion with excision of iris, as in iridectomy. In the few similar cases which I had myself seen, as well as in those of which I had read, puncture had been so commonly followed by refilling of the cyst, that I rejected it in favour of excision; because, although experience shewed that such cysts had been frequently renewed after excision, the failure might be fairly ascribed to incomplete extirpation, and I hoped that in the present case the limited structural connection of the cyst with the iris would enable me to remove it completely, and not leave any germ behind out of which a fresh cyst might be evolved.

I made an incision about $\frac{1}{2}'''$ behind the anterior margin of the cornea, rather longer than the breadth of the base of the cyst, into the anterior chamber, with a broad cutting needle. In doing this I necessarily punctured the cyst, but it did not collapse, and a spurt of aqueous humour, which followed the withdrawal of the needle, protruded it in the form of a transparent vesicle through the lips of the corneal wound. It was now easily seized with a forceps and torn away.

The wound healed directly, and the iritis and the sympathetic irritation of the other eye disappeared; but as the weather was very cold, I kept him in the hospital for several days under observation.

A week after the operation I dilated the pupil with atropine, and found a ring of opaque white capsule, and the lens gone. No doubt the fork had pricked it, and it had been absorbed, but the sight of the other eye being perfect, the extent of the injury had not been recognized at the time. The cause of the diminished visual acuity was now apparent. His mother brought him again to me on 22nd May. At this time there was not any appearance of a recurrence of the cyst, and the uveal spot was the only vestige of the injury observable on the iris.

As I had never before had an opportunity of minutely examining one of these cysts, I was very anxious to do so on this occasion, and I instantly placed the cyst in a drop of glycerine upon a glass slide, held ready by an assistant. This beautifully preserved its exquisite structure, which was further brought out by staining portions of it with carmine and rose-aniline. The cyst wall was a delicate, homogeneous membrane, varying from $\frac{1}{4300}''$ to $\frac{1}{8600}''$ in thickness. Its outer surface was overlaid by a net of fusiform cells, identical with those of the contractile tissue of the iris (fig. 3); and its inner surface was lined by a pavement epithelium, the cells of which differed much in size in different parts of the cyst (figs. 1 and 2).



Figs. 1 and 2. Epithelium from the inner surface of the cyst-wall. × 240.
Fig. 3. Long spindle cells from the outer surface of the cyst-wall. × 240

This structure agrees with the description given by Mr. Bowman,* and with an observation of Professor v. Graefe's.† Since none of the elementary tissues constituting these cysts are normally present in the iris, they must, in these instances at least, be regarded as new formations, and not simply as distensions of already existing spaces, an alternative suggested by the results of Robins' and v. Kempen's examination of the debris of three cysts of the iris removed by Desmarres‡ and Bostells.§

They occur so often after wounds that the association cannot be accidental. In fifteen out of nineteen cases which I have been able to collect, as also in the two now first recorded by myself, as well as in that published in this number by Mr. Wordsworth, there was a distinct history of a foregoing mechanical injury, and this suggests the idea that in some instances perhaps the cyst may originate out of a portion of Decemet's membrane, which may have been torn away from the back of the cornea by the penetrating foreign body, and carried before it into the iris. The probability of this suggestion is lessened by the well ascertained fact that large portions of Decemet's membrane are frequently displaced into wounds and perforating ulcers of the cornea, in the cicatrices of which we often find the most intricate involutions of this membrane intercalated with portions of iris amongst the cicatricial and proper corneal tissues; and yet analogous cysts are, I believe, unknown in the cornea. It may be, however, that this coat is too dense to allow their formation. The circumstance that in most cases the formation of the cyst has not directly followed the injury, does not nullify the origin suggested, because the accession of one or more factors external to it may be necessary to

* Bowman. Lectures on the parts concerned in the Operations on the Eye. London, 1849, p. 75.

† Prof. v. Graefe. A. f. O., Bd. xii, Abth. 2, S. 228 u. f.

‡ Cases 5 and 6 in the appended Table.

§ Case 7.

rouse the germ into activity, which remains dormant while these factors are absent.

Not to take examples from general surgery, Mr. T. P. Teale's observations of the wasting of corneal leucoma, after severing an anterior synechia, make it extremely probable that traction is, under some circumstances, a very efficient agent in exciting tissue-growth; and the quick supervention of the cyst after iridodesis, which I saw in the following case of Mr. Bowman's several years ago, affords a presumption that in this particular instance traction was the exciting cause.

II.—A malt-roaster, æt. 22, struck his left eye with the point of a knife, which pricked through the lower and nasal border of the cornea, opened the anterior chamber, and produced a hernia of the iris. The wound healed, and left an interior synechia, with a minute very eccentric pyriform pupil close to the scar. Some time afterwards he came to the hospital, March 23, 1859, to inquire if anything could be done to improve the sight of the injured eye, which was much impaired. The lower half of the pupil was found to be obstructed by a mass of uveal pigment; the upper half was clear, and dilated briskly within very narrow limits; through this he could see large objects, as the hand or fingers, but could not read. Mr. Bowman made an iridodesis at the opposite point in the corneal circumference to the original wound, which converted the pupil into an angular slit. This was followed by slight iritis, and on 17th May a cyst was noticed in the anterior chamber near the scar of the original wound, and at the opposite side of the anterior chamber to the incision made for the iridodesis. It was of a subglobular figure, and it was evidently situated between the uveal and the muscular strata of the iris. Mr. Bowman tore out the cyst, and I have a note that on September 12th it had not formed again.

An examination of all the cases which I have been able to collect shows: I. That cysts, in relation with the iris projecting into the anterior chamber, originate in two situations, 1, in the iris; and 2, in connection with the ciliary processes. The first lie between the uveal and the mus-

cular stratum of the iris, and are distinguished by the presence of muscular fibres upon their anterior wall; the second lie behind the iris, and bear the uveal as well as muscular strata on their front. II. It also shows that these cysts are of more than one kind; that there are, 1, delicate membranous cysts, with an epithelial lining and clear limpid contents; 2, thick-walled cysts, with opaque thicker contents (whether these are genetically distinct from 1 we are not yet in a position to determine, but it seems probable that they are so); 3, solid cystic collections of epithelium (Case XV.), wens or dermoid cysts; 4, cysts formed by deliquescence in myxomata (Case XVIII.). III. As regards treatment, puncture, simple or combined with laceration, is so generally unsuccessful, that excision is always preferable. It is evident that the chances of success will be proportionate to the completeness of the excision, and the practicability of this will vary with the size of the cyst and the extent of its connections, and with its position in or behind the iris.

The practical application of these considerations requires the immediate excision of the cyst directly its existence is ascertained, while it is yet small, and its connections are limited, even though at the time it may not have caused any inflammatory disturbance, or any impairment of sight; because, so far as their natural history is known to us, they invariably set up finally a destructive irido-choroiditis, sometimes attended with sympathetic ophthalmia, and in the face of this the uncertainty and the immediate risks of operative interference are not adequate reasons for withholding or deferring it.

TABULAR STATEMENT OF NINETEEN CASES OF CYSTS IN THE IRIS.

No.	Reference.	Nature of Hurt.	Time after when cyst first noticed.	Description of Cyst.	Treatment.	Remarks.
1	Tyrrell on the Eye. Vol. i, p. 368. London, 1840.	Cornea pierced by a splinter of iron, which lodged in the iris, and provoked a troublesome iritis, that left a disfigured pupil, but good sight.	Some months.	A small cyst, which gradually grew to the size of a small pea. It was attached near the pupil, and projected into the anterior chamber. Its surface was shining-white, like a delicate tendinous structure.	Removed by Mr. Scott.	The kind of operation is not mentioned. Mr. T. adds, "I believe that the patient did not retain useful sight."
2	Ditto.	The eye was struck by some bearded corn, and much inflammation followed.	A few months.	A rounded cyst, of the size of a small pea, was seated on the front of the iris, near the pupil of the right eye. It glistened like tendon.	The cyst and piece of iris on which it was seated were drawn out with a blunt hook, through a small incision at the lower border of the cornea, near the cyst. An imprudent exposure at an open window three days afterwards was followed by severe iritis and sympathetic ophthalmia. Under a mercurial treatment, she completely re-	

					covered the sight of the left eye, and partially that of the right.	
3	Wharton Jones. "Lancet," 1852, p. 569.	A prick through the lower edge of the cornea with a fork.	One year and a half.	A delicate cyst, protruding from the posterior into the anterior chamber, the lower part of the iris having been detached from its ciliary connection, and pushed upwards.	Cyst punctured by Mr. Cadge, 9th August, 1861. It collapsed, but filled again, and was punctured by Wharton Jones, November, 1861. This was followed by inflammation of the cyst, and the escape of a small quantity of yellow matter through the sclero-corneal junction.	She recovered, with perfect sight.
4	Dixon. Ann. d'Oc. T. 37, p. 141. 1857.	A prick with a fork through the sclerotic 1‴ from the lower and nasal border of the cornea.	About twelve years.	A cyst of the iris.	Punctured by Mr. Dalrymple May 20, 1846. Filled, and was punctured one month later by Mr. Dixon. August, 1848, again punctured. February, 1855, being much larger, Mr. Dixon tore it open with two needles, and then let out the contents of the anterior chamber. It filled again, and in following October, Mr. Dixon drew it out	After having been four times punctured, once torn asunder, and once pulled out, the cyst grew again, and threatened to destroy the eye.

TABULAR STATEMENT OF NINETEEN CASES OF CYSTS IN THE IRIS (*continued*).

No.	Reference.	Nature of Hurt.	Time after when cyst first noticed.	Description of Cyst.	Treatment.	Remarks.
					with a blunt hook through a corneal incision. The lens was injured, and underwent absorption, and chronic iritis occurred, leaving synechia. The cyst having again formed, was punctured Jan. 3, 1856. Four days after it was as large as ever, and in January, 1857, it nearly filled the anterior chamber.	
5	Guepin. Ann. d'Oc. T. 44. 1860. (From Desmarres Clinique.)	Discission of cataract, 27th April, 1859.	About seven months.	A large reddish-brown bilobed cyst in the lower half of the iris. Under oblique illumination both walls could be distinguished.	Desmarres drew out the cyst through an incision at the border of the cornea, and with it some opaque lens capsule, to which it adhered. In doing this an irido-dialysis occurred opposite to the wound.	Robin examined the cyst minutely. He did not find an epithelium on its inner surface, or any abnormal products, but only *débris* of the normal iris tissue.

	Ditto.	Penetrating wound of cornea, with hernia of iris.	Five months.	A bilobed bluish tumour behind a scar in the upper part of the cornea, to which the iris adhered by a single point.	Desmarres tore out the cyst through a corneal incision.	Robin did not find any epithelium on the interior of the cyst, which he regarded as formed of the tissue of the iris.
7	Bostells. Ann. d'Oc. T. 52, p. 175. 1864. (Extracted from Ann. de la Soc. du Méd. d'Anvers, September, 1854).	The absence of any scar of former wound, or trace of any other external cause, is particularly mentioned.	Probable duration more than eighteen months.	A rounded tumour, partly encroaching on the pupil, and partly hidden behind the inner part of the iris. By its opaque brown colour, it contrasted strongly with the blue colour of the iris. It adhered to, or rather formed part of, the iris, and was developed between the muscular coat, and the uvea.	Bostells drew it out through an incision at the edge of the cornea. It was very friable, and torn in pieces.	The operation was followed by sharp inflammation, and the edge of the corneal wound suppurated. Prof. Van Kempen examined the *débris*. He found only the proper elements of the iris, and conjectured that at the moment of puncture the cyst had rolled up.
8	Prof. v. Graefe. A. f. O. Bd. xii. Abth. 2. S. 228, u.f.		Probable duration more than six months.	A pretty-regular, round, yellowish vesicle in the region of the lower half of the iris, sufficiently transparent to allow a perfect illumination of its clear contents. Its convexity touched the back of the cornea; its	A linear incision was made at the side of the convexity of the cyst, so as not to injure this. Then the front wall, together with the vestige of iris coating it, was seized with a forceps, and the cyst membrane pulled	Microscopical examination showed that it was a serous cyst, with a wall composed of fine connective tissue, and a delicate internal epithelial lining; and

TABULAR STATEMENT OF NINETEEN CASES OF CYSTS IN THE IRIS (*continued*).

No.	Reference.	Nature of Hurt.	Time after when cyst first noticed.	Description of Cyst.	Treatment.	Remarks.
				posterior hemisphere seemed flatter. It measured nearly 3‴ in diameter, and 1½‴ to 2‴ thick. Its anterior wall was overlaid by the extended iris-tissue.	out. A clear, light, yellowish fluid escaped. As the last tag appeared in the wound, there was a slight resistance, due to the intimate connection of the cyst with the iris; and the operation was finished by snipping off the piece with a scissors, as in iridectomy. On the fifth day violent, purulent iritis. Little sight remained.	further, upon the anterior cyst wall, were found rarefied iris tissues, including its posterior epithelial coat, mostly deprived of pigment. Prof. v. Graefe thought it probable that the cyst proceeded from the ciliary processes.
9	Prof. v. Graefe, A. f. O., Bd. xii. Abth. 2. S. 228, u.f.	Nothing could be learned of its development.	Duration uncertain.	A serous cyst of about 2 mm. in the lower part of the iris in the tissue of this membrane. It had only moderately developed itself toward the anterior chamber, but it had pushed back the lens which was	An operation was not performed.	

				coated with the remains of the stratum of uveal pigment. Vestiges of iris tissue were also demonstrable on the front of the eyst.		
10	Ditto.	Flap operation for cataract by upper section.	Ten years and a half.	The tumour sprang from the outer and lower segment of the iris. It measured nearly 4‴, and filled the greater part of the anterior chamber; was pressed flat against the back of the cornea, and was very prominent behind. It was everywhere coated with atrophying iris. It left a small part of the pupil (which had been drawn upwards and inwards by the operation) free, and through this, with + ½ glass, the patient read No. 7 J.	None.	
11	Mr. Wordsworth. Unpublished. My Register, vol. iii, p. 151.	An arrow wound at the lower and nasal side of cornea, with hernia iridis, leav-	About eleven years.	A sub-globular, translucent vesicle, in size and shape not unlike the nucleus of the lens, at the lower and nasal	July 29th, 1866, Mr. Wordsworth tore away as much of the cyst as could be seized with a forceps, through a cor-	In the spring of this year the eyst had grown again as large as before evulsion.

TABULAR STATEMENT OF NINETEEN CASES OF CYSTS IN THE IRIS (*continued*).

No.	Reference.	Nature of Hurt.	Time after when cyst first noticed.	Description of Cyst.	Treatment.	Remarks.
		ing an anterior synechia, and a pyriform pupil.		part of the anterior chamber, attached to the iris near the synechia.	neal incision. Four days later the iris was level, and a scar was visible on its front.	
12	Mackenzie on the Diseases of the Eye, edit. iv, p. 704.	A wound.	Uncertain duration.	A small vesicle at the lower part of the iris.	Mackenzie punctured it three times through the cornea. After the third puncture it did not re-fill.	
13	Turner. Monthly Journal of Med. Science, vol. i, p. 270. 1841.		Duration uncertain.	"Passing through the pupil from the inner part of the eyeball is a semi-transparent membraneous-looking bag." The upper two-thirds of the cyst had a bluish-white appearance; the lower third was yellow, and more dense looking. The whole appeared as if filled with a thin, slightly muddy liquid, having a yellow sediment at the bottom.	Turner pushed a curved Scarpas' needle through the cyst, and divided it. The resistance was greater than he had expected.	Three-fourths of the pupil had a natural blackness; the rest was occupied by a pale whitish substance, probably the remains of the cyst. The patient saw better.

14	Combessis. Gaz. Hebdom. 1855.	Eye struck by a thin sheet of steel.	Not mentioned.	A round, opaque, whitish tumour in the blue of the eye. "Like a pearl set in the iris."	None.	
15	White Cooper. London Journal of Medicine, Sept., 1852, p. 789.	A blow, grazing the cornea. The boy had a piece of wire in his hand.	About two years.	Like a small seed-pearl. One year later a cyst of the size of a pea, lustrous, and iridescent, like a pearl.	Cooper tried to pull it out through a corneal incision, but the cyst was too hard and tough to be grasped by a canula forceps. It was as tough as cartilage, and was torn away piecemeal with a strong iris forceps. In doing this the iris was detached at its great circumference, and the cyst was seen to be attached to the ciliary ligament.	It appeared to be made up of epithelial cells so closely agglutinated that it was only after maceration that they could be separated. Recovery. Saw better.
16	Ditto.	Struck the eye against the sharp corner of a chest.	About six months.	The outer half of the anterior chamber nearly filled with a delicate, semi-transparent cyst, which pushed back the iris, and encroached on the pupil. It appeared to arise from the junction of the iris and ciliary ligament.	Punctured. Three weeks after it filled, and was again punctured. It again filled, and was then punctured and torn.	Three weeks after this no return.

TABULAR STATEMENT OF NINETEEN CASES OF CYSTS IN THE IRIS (*continued*).

No.	Reference.	Nature of Hurt.	Time after when cyst first noticed.	Description of Cyst.	Treatment.	Remarks.
17	Stoeber. Gaz. Hebdom, J. 2, p. 55.	A violent blow, 1852.	Two months.	A black spot at the outer border of the iris.—27th June, 1853. A round vesicular tumour of size of a large pea, evidently a transparent membrane containing a fluid. A few fibres of the iris were visible upon the front of the cyst.	Stoeber tried to pull out the cyst through an incision in the cornea, but failed to do so, owing to the great resistance. He, therefore, broke it up with a forceps.	December, 1857, the cyst now regained its former dimensions.
18	Richard. Gaz. Hebdom, T. 1, 1082.	Penetrating wound in infancy, leaving a white linear scar on cornea.	Patient æt 26. Four years some visual trouble.	A bilobed bluish opaline cyst; some fibres of the iris visible upon its front.	The cyst was broken up with a forceps. It was not unilocular, but a soft gelatinous mass infiltrated with a glutinous juice.	This was probably a myxoma.
19	Haynes Walton. Medical Times,	The right cornea cut with a seissors when patient was six	In patient's eighteenth year.	A semi-opaque cyst occupied upper half of anterior chamber. It was apparently attached to	Three times punctured with a needle at interval of a month. 19th July, 1854, cyst	The body of the cyst was traversed by the knife, on which a transparent gela-

Aug. 5, 1854, p. 139.	years old, after which useful sight lost.		the corneal scar, and certainly to the pupil, which it overhung.	larger. 9th August, 1854, sympathetic inflammation of left eye. Walton now pulled out the cyst with a forceps through a free corneal incision, as if for extraction of cataract through an upper section.	tinous substance escaped from it. Taylor, who minutely examined the cyst, says that it apparently sprang from a small white cicatrix in the iris, which had a fibrous structure, but he does not mention the structure of the cyst itself. V=O.

NOTE.—With reference to the case of Epithelioma of the orbit recorded by me in the last number, Mr. Wordsworth writes to me as follows, and requests me to correct in this number a misrepresentation of his views :—

"I showed it to you as a case of specific disease, but as the history of it coincided so much with an inflammatory affection, I had it explored by puncture. This only added to my conviction of its malignant nature; but, before recommending so decided a step as my opinion would necessitate, I asked Mr. Critchett and Mr. Bowman to see him. Though their opinions did not coincide with mine, I felt so satisfied that I recommended the operation, and for that purpose transferred him to you at the Middlesex Hospital, having first obtained your opinion of the case."

If I have in any way unintentionally distorted the facts of the case, or misrepresented my colleague, I frankly express my regret; but in justice to myself I must add that the published report is a substantial transcript of notes made from day to day, embodying, as I understood them at the time, the facts of the case, and the views entertained by my colleague respecting it; but as even the best of us are liable to make mistakes in diagnosis, I do not look on the acknowledgement or imputation of the fact in any difficult or ambiguous case as the slightest slur on a man's skill or experience.

May 27th, 1867. J. W. HULKE.

REMARKS ON THE USE OF A SUTURE TO CLOSE THE CORNEAL WOUND AFTER REMOVAL OF CATARACT BY FLAP-EXTRACTION.

By Henry W. Williams, M.D., of Boston, U.S.,

Ophthalmic Surgeon to the City Hospital; Vice-President of the American Ophthalmological Society.

In a prize dissertation on recent Advances in Ophthalmic Science, published at the beginning of the year 1866, I first called public attention to a modification in the operation for cataract, by bringing together the edges of the wound of the cornea by means of a suture, after extraction of the lens.

The abstract given below of 25 operations comprises all the cases treated according to this method in the City Hospital during the year 1866, and includes only those thus publicly treated; though I may, perhaps, be permitted to say that the results of cases in private practice, some of which have been watched with interest by distinguished *confrères*, have been even more gratifying (especially as regards shortening of the critical period after the operation), than those obtained at the Hospital, and in no instance, of nearly a hundred in which the suture has been employed, have I seen any harm result from its use.

The novelty of the proposed method, and the evident advantages to be hoped for, provided the fact of toleration of a suture in the cornea be once established, may perhaps excuse the publication of some details of these cases, rather than a mere general statement of their results.

The advantages claimed for this plan are briefly these: The lips of the corneal incision (and, as it seems to me, the same would be at least equally true where the incision is carried beyond the limits of the cornea), being maintained in contact, unite with more certainty by primary adhesion, and ulceration of their edges is less likely to occur.

This early cohesion of the wound greatly lessens the chance of prolapsus iridis—the danger most to be dreaded in flap extraction.

The prompt re-establishment of the anterior chamber renders it possible to make use of atropia, without fear of inducing hernia of the iris, and, by so doing, to avoid irritation from fragments of cortical substance or of capsule which may remain in the field of the pupil or the posterior chamber, thus diminishing the risk of irido-choroïditis.

The necessity for mutilation of the iris, or the repeated introduction of instruments for the removal of the lens is avoided, and flap extraction is rendered safer than some recently proposed methods, whether they are combined or not with iridectomy.

The surgeon may, if he wishes to do so, make daily examinations of the condition of the eye, with little fear of disturbing the healing process in the wound; he may instil solutions of atropia to keep up dilatation of the pupil; and, in case of the appearance of symptoms of internal inflammation, he may at once counteract them by suitable remedies.

The globe being sooner restored to nearly its normal condition, the patient may be less restricted to his bed, after the first 24 hours, and may be allowed considerable liberty of movement at an early period.

My mode of inserting the suture is as follows:—After extraction of the lens, the centre of the corneal flap is held by a delicate pair of iridectomy forceps, while a fine needle, one-fourth of an inch long, having a flat cutting point, and carrying a single strand only of the finest glover's silk, is passed through it, as near as possible to the edge. The opposite edge of the wound is then seized in the same manner, and the needle passed through at a point corresponding with the insertion of the suture in the flap. Of course so minute a needle cannot be held with the fingers, but must be passed by the aid of a needle-holder of some kind. I have used a short but strong pair of forceps, the

blades of which are roughened at their extremities. The suture is then carefully tied, and, where the silk has been waxed, a common double knot has been found sufficient, without a resort to a "surgeon's knot," so called.

The presence of the knot, although so exceedingly minute, sometimes causes slight conjunctival irritation; but far less than might have been expected, and not enough to compromise in any respect the results of the operation. Yet, after its purpose has been served, I think it best carefully to remove it, say at the end of a week or ten days after the operation. This may be readily enough done with tractable patients; but in nervous subjects it may now and then be necessary to administer ether to induce unconsciousness, before attempting it, or to leave the suture, where it gives rise to almost no annoyance, to fall of itself. In more than one instance I have seen it remain *in situ* seven weeks without inconvenience.

In all but four of the cases the extraction was done by the upper section; more recently, however, finding it easier both to insert and to remove the suture where the lower section has been made, this has been preferred.

The following general facts, applying to all the operations, are here stated, to avoid unnecessary repetition.

Complete anæsthesia has been induced by inhalation of sulphuric ether; or in a few cases, of ether reinforced with a little chloroform. This has long been my practice in operating by extraction; and, so far from observing any of the accidents which have been regarded as likely to occur during or subsequent to the anæsthesia, it has appeared to me that loss of vitreous has been less frequent where etherization has rendered the eye entirely passive, than during operations done while the patients retained consciousness, but could not control the spasmodic action of the recti muscles upon the globe. This opinion as to the advantages of anæsthesia is quite independent of my estimate of its value in facilitating the introduction of the suture, which could scarcely be safely accomplished without

its aid, but was formed and acted on long before I conceived the idea of thus holding the edges of the wound in close contact.

The dressings applied have been small compresses laid upon each eye, upon which have been placed graduated pledgets of soft lint, and these have been covered by a strip of linen or calico sufficiently long to cover the forehead and temples; the whole retained in place, without much compression, by two turns of a flannel roller.

A full anodyne has been given at bedtime, after the operation, whenever the patient seemed unlikely to sleep quietly without it, even when no pain was complained of.

In most of the cases I have made a daily examination of the general condition of the eye, and have daily introduced a drop or two of a solution of sulphate of atropia, two grains to the ounce. Perhaps, where the patient makes no complaint, inspection of the eye might with advantage be delayed till the second day. The dressings have been continued for several days; and have been applied to both eyes, whether one or both had been subjected to operation.

During the earlier months of the year, the weather being less favourable, very few extractions were done at the Hospital, and in none of these was the suture inserted. The first case for the year was on

Case I.—April 11th. Z. B., farmer, æt. 67. Right eye.

13th. Is quite comfortable. Cornea clear. Very slight injection of globe. Anterior chamber not fully established.

15th. Wound united. Anterior chamber full.

May 4. The suture has not come away, but as it caused no irritation, it was allowed to remain, and patient was discharged.

21st. Returned to Hospital, and the suture was removed (40 days after insertion). Vision excellent.

Case II.—April 18th. P. M., labourer, æt. 86. Left eye.

20th. Wound closed. Little injection. Has had no pain. Says he can see somewhat.

22nd. Can distinguish the features of a person near him.

May 14th. Suture removed, and patient discharged with good vision for large and small objects.

Case III.—May 7. J. M., Ex-Governor, æt. 73. Both eyes.

8th. Eyes look well. Has had no pain.

10th. Anterior chamber established in both eyes.

14th. Sutures removed.

June 2. A portion of capsule obstructing right pupil was divided with a needle passed through the sclera.

From this time the patient's eyes required no further attention, and though he remained in the Hospital for treatment of disease of the urinary organs, he was able to read the newspapers and to write to his friends.

Case IV.—May 25th. M. H., widow, æt. 72. Both eyes. For six days all went on well. The corneal wounds united readily, and no pain was complained of. But on 31st the pupil of the right eye was found to be filled with an exudative deposit, and much pain was felt.

June 5. The pain increasing, and serous infiltration showing itself beneath the conjunctiva of the globe and in the lids, the opaque stringy mass, apparently degenerated capsule, was removed from the pupil by means of very small forceps. This was followed by great relief, but the globe became slowly atrophied to a slight extent, with no hope of vision.

In the left eye slight prolapse of the iris occurred after the supervention of severe symptoms in right eye; but no other harm resulted than a slight displacement of the pupil, and on

Sept. 2nd the patient, who had been discharged on June 25, returned for glasses for the left eye. With + $2\frac{1}{2}$ she was able to read fine print.

Case V.—May 29th. A. H., widow, æt. 55. Right eye.

May 31st. Cornea clear. Wound closed.

June 4th. Patient etherized, and sutures removed.

June 18th. Discharged. Some threads of capsule yet remain in upper part of field of the pupil; but she has good vision.

Case VI.—June 20th. A. R., wife, æt. 77. Both eyes. The corneæ were very thin, and the globes flaccid after removal of the lenses. On this account the suture was inserted with more than ordinary difficulty, but without accident.

June 21st. Anterior chambers partially filled.

June 22nd. Wound closed; anterior chamber full.

June 29th. Sutures removed.

July 6th. With right eye can tell time by a watch with + 4. In left eye a small fragment of cortical substance still obstructs the pupil, and vision is not quite so good as in the right eye. Discharged.

Case VII.—July 6th. M. F., wife, æt. 63. Both eyes.

July 9th. Anterior chambers re-established. Cornea and pupils clear.

July 11th. Sutures taken out.

July 18th. Wished to go home to the country, and to return for glasses. Vision good with both eyes.

Case VIII.—August 16th. Rev. T. P., D.D., æt. 57. Both eyes.

August 17th. Is comfortable. Corneæ clear.

August 23rd. Removed sutures.

September 4th. With left eye reads fine print with + $2\frac{1}{2}$.

September 17th. Right pupil partially obscured by capsule. Discharged.

October 4th. Returned for a secondary operation on right eye. The capsule was lacerated, and on

October 10th. Left the hospital with excellent vision for distance with + $4\frac{1}{2}$, and for reading with + 3.

Case IX.—September 5th. E. G., wife, æt. 47. Left eye.

September 9th. Edges of wound united.

September 11th. Suture removed.

September 21st. Discharged with good vision.

Case X.—September 19th. R. B., widow, æt. 67. Right eye.

September 20th. Cornea clear. No pain.

September 22nd. Anterior chamber established.

September 29th. Suture removed.

October 15th. Discharged, well.

Case XI.—September 29th. C. S., widow, æt. 68. Both eyes.

September 30th. Patient refused an anodyne prescribed for her, and passed a most restless, nervous night.

October 1st. Complains of no pain. Wounds of corneæ healed.

October 4th. Right pupil filled with yellowish white opacity, which, after etherization, was removed with fine forceps.

October 23rd. The left pupil has become closed by an effusion of lymph, and iridectomy will be required to restore vision.

The right pupil is veiled by opaque capsule. Discharged for a visit to the country.

December 6th. The opaque capsule in right eye was freely lacerated by a needle passed through the sclera.

December 26th. The right eye is free from injection, and pupil clear. She has been highly myopic, and the fundus shows considerable changes of choroïdal structure.

Sees fairly at a distance without any glass, and reads fine print, though with some difficulty with + 4½.

The cornea and iris of left eye are in a promising condition, but another operation on this eye is deferred.

Case XII.—November 9th. J. H., locksmith, æt. 70. Right eye.

November 11th. Anterior chamber full. Very little injection.

November 14th. Dressings removed.

November 19th. Cannot yet read, but sees well at a distance with + 4½.

December 3rd. Reads with + 2½.

Case XIII.—November 15th. B. K., farmer, æt. 73. Both eyes.

November 16th. Anterior chambers full. Quite comfortable.

November 24th. Suture has come away from left and is removed from right eye.

December 7th. Sees well at distance with + 4. To wait for reading glasses.

Case XIV.—November 16th. J. L., farmer, æt. 64. Both eyes.

Has had more than one attack of irido-choroïditis, and the edges of the pupil are extensively adherent to the capsule of the crystalline. The lenses were extracted without difficulty, and the corneal wounds were healed on the second day; but some fragments of cortical substance yet remained unabsorbed in the posterior chamber. The sutures were removed on the 1st December, and patient returned home for a time. He writes that he is gaining sight, but has not yet returned.

Case XV.—December 7th. A. B., teamster, æt. 38. Left eye.

December 9th. Anterior chamber refilled. Slight injection.

December 31st. No memorandum is found of the time of re-

moval of suture or of exact visual power; but he was discharged with good sight.

Case XVI.—December 14th. D. B., widow, æt. 66. Left eye.

December 17th. Wound closed; pupil clear.

December 19th. Suture removed.

December 25th. Discharged, with good vision. To return for glasses.

Case XVII.—December 28th. S. H., widow, æt. 65. Left eye.

December 31st. Anterior chamber full. Little injection.

January 14th. Suture removed. Eye doing well.

ON THE EXTRACTION OF FOREIGN BODIES FROM THE CORNEA.

By George Lawson, F.R.C.S.,

Assistant-Surgeon to the Royal London Ophthalmic Hospital, Moorfields; and the Middlesex Hospital.

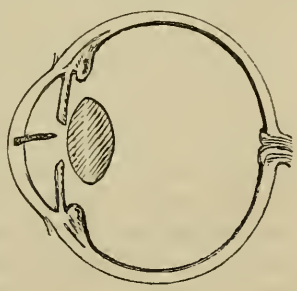
The difficulties which may beset the removal of a foreign body which has been lodged in the cornea, are well illustrated in the two following cases. On a superficial examination they closely resembled each other—in both the foreign body was a small splinter, about one-eighth of an inch in length, which had penetrated the cornea, and lodged itself so deeply that its outer extremity was buried below the corneal surface, whilst its inner end projected some distance into the anterior chamber. In both cases the endeavour to seize the foreign body from without failed, as in each it was buried too deeply to be gripped by the forceps, and any prolonged attempts would probably have forced it completely into the anterior chamber. The great difference however between the two cases was, that in the one the splinter was of iron, whilst in the other it was of wood. In the first patient I succeeded in removing the spiculum of metal by passing a broad needle into the anterior chamber, and getting the flat of the blade behind its inner projecting end, I was enabled to push the chip of metal back along the track by which it had entered, and as soon as its outer end protruded beyond the corneal surface, it was seized and drawn out with a pair of forceps by Dr. Workman, who assisted me at the operation. In the second case I at first adopted a similar proceeding, not thinking at the time that the fact of the splinter being of wood would make any material difference in the result. After introducing the broad needle within the eye, I endeavoured to force back the splinter of wood as I had done

in the previous case, but the wood had become soft and pliant, from its having been soaked in the aqueous humour, and on my applying pressure to its inner end, it at once bent up against the cornea. I was therefore obliged to enlarge the opening in the cornea made with the broad needle, and to introduce a pair of fine iris forceps within the anterior chamber, with which I seized the extremity of the thorn and drew it from the eye. In doing this the iris was slightly torn by the thorn as it was drawn over its surface; I therefore drew out the piece of iris which had been injured and excised it.

The patient recovered without an unfavourable symptom, and with the sight unimpaired.

Case I.—Andrew B., æt 28, a boiler maker, came to the hospital as an out-patient on January 10, 1867, having the previous day met with the following accident. He was punching a plate of iron when a spiculum of metal flew off and lodged itself deeply in the cornea. All the attempts made by his fellow-workmen to remove it were unsuccessful; it was too deeply buried to be easily dislodged.

On examination the eye presented the appearance represented on a somewhat magnified scale in the wood-cut. A small splinter of iron had penetrated the cornea. On looking at the eye sideways, one end of it was seen extending across the anterior chamber, and almost in contact with the lens, whilst the other extremity could be felt with a spud beneath the epithelium on the surface of the cornea. I endeavoured to seize the outer end of the chip of metal with a pair of forceps, and thus to draw it out of the eye, but this I found was impracticable; and as it seemed likely that any prolonged attempts to remove it from without, would end in pushing it completely into the eye I adopted the proceeding I have already narrated. The splinter of metal as it entered the eye, must have wounded the lens, as it was cataractous.



The patient afterwards came under the care of Mr. Bowman, and by him the opaque lens was removed. The man completely recovered, with a very excellent eye. With a + 2½ glass he could read Jaeger's No. 1; and with + 3½ he could tell the clock at 20 feet.

Case II.—John L., æt 62, came under my care at the Ophthalmic Hospital, on March 22, 1867, suffering from the following injury. Seven weeks previously whilst cutting down a hedge, a thorn was driven with force into the right eye. He had experienced but slight inconvenience since the accident, and had undergone no treatment for the removal of the foreign body. On examining the eye, it presented as near as possible the appearance represented in the wood-cut in Case I. The thorn had penetrated the cornea, and so deeply, that its outer end was buried below the corneal epithelium, whilst its inner half was projecting into the anterior chamber. The outer end could be felt with the spud, but knowing that it would be useless to attempt to get at it from without, I tried the plan which had answered so admirably in Case I., of introducing a broad needle through the margin of the cornea, and with the flat of the blade pushing the splinter back along the course by which it had entered. I had not however taken into consideration that although the cases were apparently similar, yet that the foreign bodies were composed of different materials. The thorn, soaked by the aqueous, had become soft and pliant, and as soon as the blade of the broad needle pressed against it, it bent towards the inner surface of the cornea. I therefore at once enlarged the opening made by the introduction of the broad needle, and passing a pair of fine iris forceps within the anterior chamber, seized hold of the inner end of the thorn, and drew it out of the eye. In doing so, however, the iris was torn by the thorn as it passed over its surface. I therefore performed a small iridectomy by excising the portion of iris which had been wounded. The lens was uninjured. The patient progressed without an untoward symptom, and on March 29th he was discharged the hospital quite well.

CASES OF RETINITIS PIGMENTOSA, WITH REMARKS.

By Jonathan Hutchinson, F.R.C.S.

Retinitis pigmentosa is so rare a disease in English practice that I am induced to record in detail the following examples of it:—

Case I.—John Brickett, æt. 57, was admitted May 9, 1867, under my care at Moorfields.

He was a thin but healthy-looking man, of dark complexion. He told us he could see well till the age of 18, when his sight gradually began to fail, especially at night. Some twenty years ago his sight failed more rapidly; but during the last five years he thought he had been much the same. During all this time, thirty-nine years, he had been without pain in his eyes, troubled with muscæ occasionally, and gradually becoming unable to see at night. This latter symptom seemed to have been well marked. He said that even when he could see pretty well in the daytime, he could not see his wife walking by his side at all after sunset, even though there was good moonlight.

There was no history of syphilis. He had had twelve children, none of whom presented any symptoms. His wife looked quite healthy. His father and mother were not related.

He could just count fingers, and direct his eyes for ophthalmoscopic examination.

The conditions in the two eyes were very similar. In each the optic disc was of a creamy grey-white; its vessels very small. It was not easy to distinguish the vein from the artery, as the latter was exceedingly small. The margins of the nerve were indistinct. The trunks of the vessels on the discs were indistinctly traced. The discs themselves, and adjacent portions of retina, were decidedly hazy. Around each disc was a large patch of grey-white, produced by partial choroidal absorption. At parts, the boundaries of this patch were definite and abrupt, at others indistinct. The choroid was everywhere pale, and speckled in most parts by dots and patches of yellow, consequent on absorption of epithelium, &c. Some of these patches

had very definite boundaries, but most of them were indistinct. In each eye, about the yellow spot, there was less disturbance of the choroid than elsewhere. At the periphery there were very extensive accumulations of coal black pigment (stars, clouds, &c.). Beneath these accumulations of pigment the choroid was seen to be yellow, and speckled with white. The pigment accumulations to the right and left of the optic disc were much more abundant than above and below.

It is to be noted that the pigment accumulations were everywhere arranged in stars, or in a sort of network. There were no absolutely isolated masses. In almost all parts wherever there was a little speck of pigment it could be distinguished that the choroid beneath it, and over a much larger area than that occupied by the pigment, had lost its epithelium. It is to be observed, however, that there were no conspicuous patches of choroidal atrophy; that is, none where the absorption of the whole thickness of the choroid was complete, and the bare sclerotic seen through.

Being much interested in the illustration of the transmission of hereditary tendencies which this curious disease supplies, I requested that one of Brickett's daughters, who, he said, was beginning to fail in sight, should attend for examination. The following are the interesting particulars of her case :—

Case II.—A daughter of J. Brickett, æt. 19, came for examination on June 6, 1867. She was of dark complexion, with brown hair, and gray eyes. She considered that she resembled her mother much more than her father. She stated that till twelvemonths before she had good eyesight, and could see to do needlework well. Her chief complaint was that "her sight left her in an evening."

With the ophthalmoscope the disc in the right eye was seen to be of good colour; at its apparent upper part was a very narrow notched crescent without pigment. The branches of the arteria centralis were rather less than usual, and not so easily traced on the surface of the disc as usual. There were, however, scarcely any deviations from the normal condition near the central parts. Towards the periphery we found the choroid

presenting numerous very small, round, ill-defined white pits, and here and there were, in connection with these, very minute dots of pigment. The chief disease was to the nasal side, and near the extreme periphery. Here we found patches of rather large size where the epithelial layer of the choroid was absorbed, and in the retina above were numerous specks and long streaks of pigment. These pigment accumulations were, many of them, placed along the course of the retinal vessels, and internal to them.

The conditions in the two eyes were quite symmetrical. The pigment accumulations were not seen in any quantity, excepting to the nasal side of the disc. On the temporal side the yellow spot appeared quite healthy, but beyond it, towards the periphery, we found numerous little white spots in the choroid, but no pigment accumulations.

Case III.—The subject of the following case is a man aged 34. His history is the following. He married at the age of 19, and considered he had very good sight for three or four years afterwards, but then he found his sight began to fail. At first he was troubled with sparks and rainbows, then he became in a fog, which was chiefly in the centre, and by looking to one side he could see better. The central fog gradually increased. Neither he nor his wife had noticed much difference in his ability to see in the daylight and in the dusk. They both say that as long as he could see his way about by day, he could at night. His sight failed slowly but steadily, and at the end of about 18 months, that is nine years ago, he was obliged to give up his work, that of iron ship building. He and his wife were not related before marriage. They have never had any children. There is no history of syphilis nor any family history of defective sight. His health has been good throughout.

The oscillations of the globes render the examination rather more difficult than usual.

The conditions are fairly symmetrical. The media are clear with the exception of a star-shaped striation in posterior pole of each lens.

The optic disc is of a gray white colour. The central vessels very much diminished, the artery is but just perceptible. The physiological cup is well marked in each. In the right eye the margin of the disc is surrounded with pigment, and the choroid

is jagged, but there is none in the left. There are no large patches of absorbed choroid anywhere, but almost universally the choroid appears to be studded with small white dots. At the periphery are numerous collections of pigment arranged in dots, streaks, &c., many of these are peculiarly fine and delicate. Amongst them the choroid is seen to be absorbed in small patches. Where the deposits of pigment are isolated each appears to be on a ground of white. The accumulations in any quantity are all situated at the periphery, the central parts appearing free, but on close examination a few dots of pigment are found near the yellow spot.

The vessels cannot be traced very far, but the pigment accumulations do not appear to coincide in direction with them.

NOTES OF MISCELLANEOUS CASES.

By Jonathan Hutchinson, F.R.C.S.

(Continued from vol. v, page 335.)

No. XIX.—*Optic Neuritis in a Child, following Severe Cerebral Symptoms.*

The following case is of interest, as an addition to the series of cases of optic neuritis in children which I reported in our last number :—

Ellen Hill, a little girl, æt. 11, apparently in good health, was brought on February 7th in a condition of total blindness. Her pupils were widely dilated and fixed, and she had the amaurotic expression in a marked degree.

On ophthalmoscopic examination we found the media quite clear, and there was no disease of the fundus, excepting in the immediate neighbourhood of the discs. In each eye the disc was swollen and "woolly," from the effusion of lymph, being of a pale grey colour, mottled with pink. The arteries were small in size, and their trunks partially concealed. The veins were of moderate size. There were no apoplexies.

The history which we obtained was that a week before Christmas she had begun to complain of headache, which was quickly followed by drooping of the right eyelid. She became very ill, and was several weeks in bed, suffering most severely from the pains in her elbows and in her head. She was early attacked by convulsions, which recurred every few hours, night and day, for nearly a fortnight. They gradually diminished in violence and frequency, and at length ceased. A week after the commencement of her illness her sight was found to be very imperfect. The failure was very rapid, and she one day exclaimed suddenly, "I can hear you, but I cannot see you."

The ptosis persisted until within a week of her admission at Moorfields. When she came to us it was about six weeks from the commencement of her illness, and, with the exception of the optic neuritis, all evidence of cerebral disease had disappeared. She was quite free from headache, cheerful, and looking well.

No. XX.—*Unsymmetrical Ocular Peculiarities in patients whose Irides were of different colours.*

I recorded some years ago some instances of unsymmetrical morbid changes in the eyes occurring in persons who had the colour of the iris in one eye different from that in the other.

The two following may perhaps be considered to have some little interest in connexion with this subject:—

Mrs. G., æt. 35, has a grey iris in her right eye, and a light-brown one in her left. Both eyes are hypermetropic one-eighth, but her right eye has also considerable amblyopia. Her left with + 8 is perfect; whilst with the right she sees only 50 (Snellen) at twenty feet, and can only read No. 4 (Jaeger). In the right eye nothing abormal is discovered with the ophthalmoscope, excepting perhaps a slight pallor of the disc. In the left eye, which is quite normal in all other respects, the hypermetropia excepted, there is a small white patch of opacity in the retina, which conceals the trunk of one of the veins. The patch is very narrow, but the venous trunk seems to pass through it. There is no similar patch in the other eye.

Mr. Frederick Mackenzie was kind enough to draw my attention to the following case. The man was under Mr. Curling's care in the London Hospital on account of an accident:—

James Hill, æt. 26, has one brown iris and one blue one. His sight appears to be perfect in both eyes, but it is curious that the diameter of the pupil in the blue eye is only about half that in the brown one.

No. XXI.—*Inherited Syphilis, with Choroiditis—Absence of ill results in the third generation.*

Mrs. E., æt. 44, came under my care at Moorfields on account of extensive opacities in her corneæ, consequent on syphilitic keratitis. She had also some opacity in her right lens, and very extensive patches of denuded sclerotic around the disc in each

eye. There were no evidences of choroiditis at other parts of the fundus. Mrs. E.'s physiognomy was characteristic of inherited syphilis. She had one typical tooth remaining, and she had been utterly deaf for eighteen years. To me the chief interest of her case consisted in the fact that she was married, and had borne a healthy family. She had three grown up children, all of whom were, according to her statement, in excellent health, and none of whom had ever suffered from disease, either of eyes or skin.

No. XXII.—*Neuralgia, followed by Glaucoma.*

The following case appears to illustrate the occurrence of glaucomatous disease of the globes in connexion with some condition of the nervous centres, of which liability to intense neuralgia is the most prominent symptom. The neuralgia of which I speak was, of course, not that which so constantly attends the glaucomatous process, but had long preceded its occurrence.

Mrs. M., æt. 50, is now quite blind in both eyes, and has a secondary cataract in each. I have had no opportunity of watching the course of the disease, and can only describe her present condition, and give the statements which she makes as to her history. She is at present in fair health; her smell, taste, and hearing are good. She is liable to what she calls seizures, during which she almost loses consciousness, but never quite. She still suffers occasionally from severe pain in the occiput, and she has recently had an attack of urticaria. In early life she was liable to very severe headaches, for which she was repeatedly bled and cupped; with the exception of these she had fair general health, and she married and bore a family. Her right eye was lost four years ago, after an attack of dreadful pain in the eye and forehead. She had been liable to most severe pain in the right forehead for some years before. After the eye had become quite blind, the neuralgia abated, but a year or two later she began to suffer in her left forehead in a similar way, and 18 months ago her left eye began to be painful as the other had been, and soon became blind. She compared the pain in the eyeballs to that of toothache, stating that it would come on very suddenly, was of a stabbing character, and would cease suddenly.

Present condition of the eyes. Neither globe is materially hardened; in both the sclerotic is thinned and bluish, and the emergent veins larger and more numerous than usual. The cornea of the right is quite clear and polished on its surface; that of the left is transparent, but is slightly steamy on the surface. The iris of the left is atrophied, deficient in lustre, and quite motionless, whilst the lens is opaque with a slight greenish tinge. In the right the lens is partially absorbed, and the iris very adherent to it; the iris tissue, however, is much less atrophied than in the other eye.

No. XXIV.—*Herpes on the Forehead.—No affection of the Eye.*

Joseph Haynes, æt. 4, was admitted on February 4, with herpes on the left forehead. There was a group of confluent vesicles in the middle of the upper lid, another amongst the hairs of the eyebrow, and others about the middle of the left forehead.

There was slight œdema of the upper lid, but there were no vesicles on the nose, nor was the lower eyelid in any way affected. The eye itself was not inflamed.

The case was a mild one, and the eruption which had come out on the day before his admission, had wholly disappeared in the course of a week. The case is of interest in consequence of the coincident absence of vesicles on the side of the nose, and of inflammation of the eye, due, probably, to the circumstance that the oculo-nasal nerve was not affected.

No. XXV.—*Herpes on the Forehead and upper parts of Nose two years ago.*

Thomas Redburn, æt. 9, applied on January 24, on account of a leucoma on his right cornea. The scars of herpes were quite distinct on the right half of his forehead, and on the right side of his nose, near to the inner canthus. There were two deep ones on the temple, near to the outer canthus, but none on the lower eyelid or cheek. The history was that the eruption had occurred two years ago, and had gone through the usual course. The ulcer on the cornea, of which the leucoma was the result, occurred two months after the eruption. There might possibly

be an error in this history, or perhaps the corneal ulcer had no connection with the herpes.

No. XXVI.—*Herpes Frontalis.—No Vesicles on Nose.—Eye not Inflamed.*

Collin Turnbull, a healthy looking lad, æt. 12, was admitted July 17, at the Skin Department, London Hospital, on account of the remains of an eruption of herpes zoster on the forehead. The remains consisted of a number of deep, well marked scars, arranged in a line just to the right of the middle of the forehead, and of two on the right upper eyelid. There were some scabs in the hair of the right side. There were none on the lower eyelid, nose, &c. The eye was not affected.

This was the fifth day of the appearance of the rash. It had not been preceded by any complaint of pain. He had been in usual health, but had had an attack of "nettlerash" on the body a few days before. The spots in the upper eyelid were said to be more recent than those on the forehead.

No. XXVII.—*Herpes Frontalis after the use of Arsenic—No vesicles on the Nose, and no inflammation of the Eye.*

Anne Robins, æt. 44, had been attending under my care at the Hospital for Diseases of the Skin since April 9th, for psoriasis. She was ordered six minims of liquor arsenicalis twice daily. On June 14th the dose was diminished to three minims three times a day. When she came, on July 12th, she presented the remains of a rash on her right forehead which she stated had appeared a fortnight before, and had been entirely confined to the right side of the forehead. At the commencement of the attack she had felt great pain all over the right forehead, and this lasted for two days, when a good many spots appeared, and the pain was considerably eased. A number of the spots had dried up at the time of her visit, and the scabs had fallen off, the spots which remained appeared to be getting rapidly well of themselves. There had been no spots whatever on the nose and the eye was not affected in the least. Scars were left where the spots had been. She complained of not feeling so well in herself when taking the medicine. The psoriasis was very much better.

No. XXVIII.—*Remarks on the importance of the exact position affected by Herpes of parts supplied by the Ophthalmic division of the 5th Nerve.*

Since my paper on this subject was published, I have had a portrait taken of G. Morgan (Case I) to show the position of the scars. His case was a very severe one, and the eye was practically lost by iritis, &c.

The wood-cut shows exactly the position of the scars. The artist has, however, found much difficulty in representing the depressions produced by the scars, and it must be considered chiefly as a key to their position.

All the cases that I have yet seen, support the opinion I have expressed, that it is only when the side of the nose is affected, that any serious inflammation of the eye ensues, and that in the worst cases the vesicles will be found on the very tip of the nose, the part supplied by the oculo-nasal nerve. In most of the cases which I have seen recently, the eruption was on the forehead only, and in none of these did the eye suffer.

NOTES OF HOSPITAL CASES.

Case I.—*Tumour of Orbit. Removal on three occasions, with return of Growth.*

(Case under the care of Mr. Wordsworth.)

(Reported by Mr. Spencer Watson.)

A married woman, 35 years of age, of spare habit, but fresh colour, was admitted into the Royal London Ophthalmic Hospital, under the care of Mr. Wordsworth, on January 25, 1865, with a tumour at the inner corner of the right eye.

The tumour was red and vascular, of the size of a filbert, and of rounded form, projects in the situation of the caruncle, smooth and moistened with mucus, and accompanied by a constant sanious oozing over the cheek. The surrounding integument of the eyelids and cheek was reddened and desquamating. She did not suffer much pain. The eyeball was very slightly, if at all, displaced, and vision was not affected. She stated that it had been growing for three years, and that it had been removed three weeks ago by Mr. McMillan, of Hull, since which, however, it had grown to the present dimension, *i. e.*, to about the same size as it was before the operation. On January 28th, chloroform was administered, and Mr. Wordsworth removed the growth, cutting deeply down along the inside of the globe, and applying the actual cautery to the raw surface. The hæmorrhage during the operation was very free, but was arrested speedily by the application of the cautery. She made a good recovery, but the growth returned within a few weeks, and, on her return to Hull, it was again removed by Mr. McMillan, who writes word to say that on March 10, 1865, "It is again sprouting out, with constant sanguineous discharge. She is more anœmic in her appearance, complains of a feeling of numbness on the right side of the head, and of dizziness. The pressure required to retard the sanguineous discharge is now irritating the eyeball, which, however, has all its motions and vision intact. I am disposed to try the caustic potash, &c., destroying as much as I can, taking care of the eyeball, the conjunctiva of which I fear is also be-

coming implicated." This patient died on 1, 1866, "in January consequence of hæmorrhage from the tumour and compression on the brain." No post-mortem inspection was allowed.

Microscopic Structure of the Growth.—When examined at its second removal, it was found to consist entirely of large soft cells, with nuclei and nucleoli very distinct, and there was an entire absence of any intercellular matrix. The cells varied in form, but not very much in size, and gave the impression of being of the soft cancerous nature.

Case II.—*Optic Neuritis in connexion with Constitutional Syphilis.*

The following three cases are reported by Mr. Frederick Mackenzie, from the practice of Dr. Hughlings Jackson, at the London Hospital. As will be seen by a reference to pp. 261 and 262 of our last volume, Dr. Hughlings Jackson has not found reasons for believing that optic neuritis, or epilepsy," are due to syphilis in any special manner. These two symptoms will occur in association with *any sort* of coarse disease of almost any part of the encephalon.

John W., farm labourer, æt. 34.

He has been a moderately healthy man all his life, with the exception of rheumatics and jaundice, which he had while a soldier in India.

There is a history of chancre twelve years ago, also of a rash, but he had no sore throat. For this he was treated by Mr. Luke, who salivated him.

He states that he had again a chancre and a rash three years ago, while in India. Since then he has had an eruption on his feet.

For the last six months he has nearly lost his memory, not being able to remember the days of the week, and on taking a walk in the neighbourhood of his home, he could not find his way back.

For some time previous to his coming to the hospital, he had suffered severe pain in the left eyeball, and slight pain in the right, and was rarely free from pain in the forehead. He also states, that three or more years ago he had pains in both his shin-bones, in his head, and in the shaft of the humerus.

He was admitted into the London Hospital July 26, 1866, with severe pain across his forehead. He said that he could not sleep at night. He would sometimes get up in the night and walk about, staggering like a drunken man.

He was ordered a mixture containing iodide of potassium.

27th. He was in bed sleeping soundly, and was with difficulty aroused. When not in very severe pain he always sleeps soundly in the day.

Ophthalmoscopic Examination.—The media were clear. The left disc was woolly, and of a pink colour, the veins were large and embedded in the margin of the disc; the arteries were small, the disc was surrounded with recent extravasations. The right disc was ill-defined and much congested. [Extravasations were not noticed till fourteen days after this date.]

His vision was not greatly impaired, as he now and then was seen reading, without complaining of any trouble in doing so. I did not, however, test it accurately.

He left the hospital in about six weeks' time, free from pain, still taking the iodide of potassium. His memory was perfect. He did not notice that his sight failed him. Both discs were white and fluffy-looking; the retinal vessels appeared normal.

Case III.—*Optic Neuritis in connexion with Constitutional Syphilis—Hemiplegia.*

A commercial traveller, æt. 39, in the wine trade. He had been very intemperate. He is a well-nourished man, of fair complexion; he married when eighteen years old, and his wife has had six children, the last two of which were still-born. There is a history of syphilis contracted ten years ago. He then had a chancre, an abscess in the right groin, sore throat, and a rash. He was under medical treatment for these; he was salivated, and afterwards "took a good deal of sarsaparilla."

About one year ago he was seized with a fit; after which he was hemiplegic of the left side. Since he has had more than fifty fits, and has suffered a good deal from frontal headache. At first the fits only affected the left side of his body and limbs, now they affect both. They begin in the left hand.

He looks amaurotic. Says he has lost his sight for three months. The left eye began to be misty first, and he noticed that he could not see to read easily; about six weeks after this the right also became dim. His vision is very imperfect, and he reads only large print at 8″.

Ophthalmoscopic Examination.—The left disc has a woolly appearance, and is of a white colour. The vessels are diminished in size and hidden in the white material occupying the whole of the disc. The right disc is in much the same condition, except that the vessels are smaller.

He took iodide and bromide of potassium for two months, and left the hospital free from headache, and with scarcely any paralysis.

CASE IV.—*Optic Neuritis in connexion with Constitutional Syphilis.*

Eliza C., æt. 28, has been married for the last ten years; has no children, and has never had a miscarriage.

She is fairly nourished; of light complexion. There are a number of copper-coloured papules on her face. She states that she was regular until four months ago, but that her usual monthly discharge had been decreasing gradually for some time previously.

There is no history of primary syphilis, and she does not remember having had a sore throat or rash. Seven or eight years ago she "had lumps as big as marbles on both her shin bones," and suffered very severe pain in them at night. At the same time she had pain in her head also.

She has been subject to fits for a year and a half. The first happened while she was asleep. On awaking she felt the sensation of pins and needles in her left arm, and she noticed that her left arm and leg were paralysed. Since then she has had many fits—sometimes five or six a day. She knew when the fits were coming on by a tingling feeling, which commenced in the fingers of the left hand, then in the great toe, up the left leg, arm, shoulder, neck, side of face and head. She has had severe pain in the right side of head and in the right temple ever since she first had fits.

The pain prevented her resting at night. She has also noticed that she lost her memory of late, not being able to find things that she had put away a few minutes before, nor to remember her way about.

Her sight failed her soon after the fits commenced. The right eye became dim first, but they are nearly equally imperfect now. She sees nothing plainly at the distance; can make out No. 16 (J.) slowly, but it makes her eyes ache directly. Admitted into the hospital March 26th. Was ordered iodide of potassium. *Ophth. examin:* Both discs are elevated, of a white colour, with a cloudy margin. The vena centralis is large in both, and buried partially in the disc. She remained in the hospital two months, taking the medicine. The pain in her head ceased; she had no fits, but her sight was not improved.

June 10th.—I saw her to-day. She is in good health and spirits; in little or no pain; has not had any fits lately. Her sight is still very bad.

The optic discs are still slightly elevated; the margins are distinct. Both the central artery and vein are smaller than normal—the vein especially. She sees nothing in distance, and spells No. 16 (J.) slowly at 8″.

The two following cases are interesting in connexion with the preceding ones, as illustrations of some of the causes of optic neuritis. In one, the cause was a syphilitic taint, in the other the patient had been poisoned by working in mercury. The notes of both have been supplied by Mr. W. Square, one of the clinical assistants at Moorfields.

Case V.—*Optic Neuritis in connexion with Tertiary Syphilis.*

Thomas Thomas, aged 41, was admitted on May 30th, 1867. He was a very unhealthy looking man, and complained that his sight had been failing for six months. He also said that he made a great deal of water, sometimes half a gallon a day. A specimen he brought for examination gave no evidence of the presence of albumen, but contained a considerable amount of

colouring matter. The specific gravity was 1031. On questioning him as to his previous history he admitted that he had syphilis twelve years before, followed by a scaly rash, pains in his bones, nodes on his skull, and constant pain in his head. He had had four children; one was still-born, two died young, and the other was reported to be healthy.

On testing his sight it was found that he could read No. 16 Jaeger. With the ophthalmoscope the optic disc was found to be partly concealed, the edge ill-defined and jagged. The veins were large and interrupted in various places. There were no extravasations of blood. The other structures of the eye appeared normal.

Case VI.—*Optic Neuritis in connexion with Mercurial Poisoning.*

William Webb, a strong, stout man, engaged in the manufacture of calomel, was admitted on April 2nd, 1867. He stated that his sight had begun to grow dim five weeks previously, and had failed so rapidly that he was quite blind within a fortnight. He had been taken ill four months before, with pains in the limbs, and tremors, and much headache. He did not lose flesh nor appetite, but had found that he could only walk with difficulty, staggering a good deal and liable to fall, sometimes he could not stand at all.

As above stated he was quite blind, and had been so for three weeks before he came under care, though he thought occasionally he had been able to see a very bright light. The pupils were dilated and motionless, the media were clear. The optic disc appeared prominent, the vessels being pushed forwards by effusion and in some places were interrupted. The edge of the disc was ill-defined.

On April 8th, he was worse, being delirious at night, and troubled with great headache.

On May 1st, he was better, having gradually improved since preceding note, and had left the hospital. The exudation had cleared off in a somewhat diagonal direction, from within outwards, leaving behind a perfectly white surface. The veins were large, the arteries small. The margins of the disc still

remained jagged, and there had been no improvement in the state of his vision.

CASE VII.—*Symmetrical Optic Neuritis in connexion with Lead Poisoning.*

(Case under the care of MR. HUTCHINSON.)

(Reported by MR. WAREN TAY.)

Mary Welsh, æt. 19, was admitted, July 13th, 1867, at the Ophthalmic Department, London Hospital, under Mr. Hutchinson's care.

She was led into the room by a friend, being quite blind. Her pupils were large and fixed, and her aspect quite that of confirmed blindness. She told us that she had been in St. Bartholomew's Hospital until a fortnight ago, and had been in total darkness for nine or ten weeks. Her history was that she had begun to work in a lead mill two years previously, but did not find any serious inconvenience from the occupation until four months ago. She had to handle the lead, and had never taken any precautions to prevent lead poisoning. At the time mentioned, she was admitted into the London Hospital for colic, and slight paralysis of the extensors of the wrists. She recovered well and went back to her work as before, till she began to be very sick, about 14 weeks ago. The vomited matters were of a greenish colour, and the vomiting occurred very frequently in the course of the day. This went on for five weeks, accompanied by severe pain at the back of her head, and an indistinctness of vision, as if there was a film before her eyes, and then she became rather suddenly as blind as on her admission nine or ten weeks later. She also complained of a numbness in the tips of her fingers, but she could distinguish various objects given her as tests, and the difference between rough and smooth objects.

Both discs showed the usual conditions of optic neuritis, being covered with lymph. There were also numerous apoplexies near them.

Case VIII.—*Symmetrical Optic Neuritis in a Child, without the usual history of severe Illness.*

(Case under the care of Mr. Hutchinson.)

(Reported by Mr. Waren Tay.)

Since Case XIX, p. 43, was reported, another young patient was brought by his mother, suffering from optic neuritis.

William Wells, æt. 7, was admitted, July 22nd, at the Moorfields Hospital under Mr. Hutchinson's care. His mother said that until six months before he had been playing about with the other children, and his sight appeared to be good. About that time she began to notice that sometimes he seemed stupid, and as if he could not see objects she handed to him, occasionally missing her hand held out to him, running up against things, &c. He continued to go to school, however, as his brother led him there, till three months previously, when it became evidently useless to send him any longer. During the whole time he had not been laid up in bed; had not complained of either sickness or headache; his appetite had been good, and his mother had not thought him at all out of health.

He looked rather short for his age, quite healthy and intelligent, and seemed in good spirits. His pupils were of normal size, and acted fairly. He could spell out letters of No. 20 Jaeger, and rather better with the right than the left eye.

Ophthalmoscopic Appearances.—The optic disc in each eye was of a dirty-grey colour, and its margins were obscured by the remains of lymph. At the yellow spot there was morbid changes of the same kind as those described in the preceding cases. The central vessels were considerably diminished in size; the veins much less so, however, than the arteries.

Part II.

A Periscope

OF

CONTEMPORARY OPHTHALMIC LITERATURE.

MR. WILSON ON DISEASES OF THE EYE IN CEREBRO-SPINAL MENINGITIS.

Dublin Quarterly Journal, May, 1867.

Mr. Wilson records his experience of eye complications in connexion with the cases of cerebro-spinal meningitis which have lately been common in Ireland. Five cases are detailed, in four of which the right eye was the only one affected, whilst in the fifth both suffered. Mr. Wilson distinguishes several different elements in the disease as far as the eye is concerned. The worst is a general effusive inflammation of the globe;—cornea, iris, choroid, retina, &c., whilst in less severe cases the conjunctiva, or the conjunctiva together with the cornea may be the parts chiefly affected. Proptosis and lagophthalmos appear to be frequent, and to be due sometimes to swelling of the orbital cellular tissue, sometimes to spasm of the levator, or partial paralysis of the orbicularis. In some, the inflammation of the cornea, &c., seems to be consequent, as in cholera, &c., to exposure of the front of the eye, but in others it is not so. In the cases of panophthalmitis chemosis and hypopyon are usually present, and deep ulcers in the cornea may form. The occurrence of petechial spots is mentioned in connection with most of the cases.

Some of the eyes seem to have been saved under very unpromising conditions. Mr. Wilson strongly urges the use of atropine locally, and considering that the eye disease is a result of general blood poisoning, leaves the constitutional treatment to the physician. Mercury and iodides appear to have been used in most cases.

As regards the stage of the disease at which the eye complica-

tion occurs, it would appear to be from the third to to the seventh day.

Mr. Wilson adds that "amaurosis is not an unconmon sequence of cerebro-spinal meningitis." He attributes it to changes within the skull but says nothing as to the presence or absence of optic neuritis. It would be very interesting to have further information on this point. The subject is a very important one.

RESEARCHES INTO THE COURSE AND CONNECTIONS OF THE BLOOD-VESSELS IN THE HUMAN EYE.

By Dr. M. Leber (*Arch. f. O.*, xi, 1). ABSTRACT.

SINCE the ophthalmoscope has rendered it easy to see and examine during life the vessels of the retina, and sometimes also of the choroid, an exact knowledge of the course of the circulation in the eye has become a matter of increased interest. There are many questions that cannot be solved by ophthalmoscopic examination alone; and that require precise anatomical information. The earlier descriptions of the ocular vessels rest entirely upon injections with granular material, and the modern art of injecting transparent fluids under low pressure seems to afford a basis for further examinations. Before proceeding to state in detail the results thus obtained, it will be well to glance at the general character of the ocular circulation.

The eye and its appendages receive arterial blood almost exclusively from the ophthalmic artery; the terminal branches of which anastomose, on the eyelids, temples, &c., with those of other arteries, such as the facial, the anterior temporal, the transverse facial, and the zygomatico-orbital; so that through these also some blood may reach the outer parts of the eye. Of the vessels which supply the eyeball itself, only those of the conjunctiva anastomose with these external vessels.

The return of blood takes place chiefly through the ophthalmic vein to the cavernous sinus; and in small part also through the connection between the ophthalmic and the anterior facial veins at the inner angle of the eye.

Besides the branches to the ocular appendages, the ophthalmic artery and vein, by their ramifications, may be said to form two, or even three, distinct vascular systems: namely, the *retinal*, the *ciliary*, and, as an accessory, the *conjunctival*. These systems possess special afferent and efferent vessels, and are not completely isolated from each other, but more or less in union. The retinal system is formed from the central retinal artery and vein, which traverse the optic nerve, and send branches on all sides. The ciliary system supplies the sclera and choroid, and

is formed by the ciliary arteries and veins. Among the ciliary arteries we distinguish, 1, *the short posterior ciliary*, direct branches from the ophthalmic or the lacrymal artery, which ramify in the posterior portion of the sclera and in the choroid, and send twigs to the entrance of the optic nerve. 2. *The long posterior ciliary*, arising like the former, and supplying the ciliary bodies, the iris, and the anterior part of the choroid. 3. *The anterior ciliary*, branches from the vessels of the recti muscles, supplying the same parts as the preceding group, and also sending twigs to the anterior part of the sclera, the corneal margin, and the inner zone of conjunctiva.

The ciliary veins are, 1. *The vasa vorticosa*, which receive at the equator the greater part of the venous blood from the choroid, and twigs from the sclera. 2. *The posterior ciliary veins*, small vessels at the posterior pole, proceeding from the sclera only, and receiving nothing from the choroid. 3. *The anterior ciliary veins*, which receive twigs from the interior of the eyeball only from the ciliary muscle; and others from the anterior part of the sclera, the corneal margin, and the inner zone of conjunctiva. There are no perforating veins to correspond with the long posterior ciliary arteries.

The union between the vessels of the Retina and of the Choroid.—The retinal system is very independent, and unites with the ciliary at one point only, the entrance of the optic nerve. This union takes place chiefly through the arterial circlet described by Haller and Zinn, that is formed in the sclera immediately around the nerve entrance, and to which attention has been recently called by E. Jaeger. This circlet is formed by two or three twigs from the short posterior ciliary arteries, which enter the sclera close to the nerve, and ramify to form a fine wreath around the latter. From this wreath, as from the other short ciliary arteries, numerous twigs proceed to the choroid, and others penetrate the optic nerve. In flat preparations of the sclera, the retina and choroid being removed, and the nerve cut off level with the scleral surface, it may be seen that most of the twigs to the nerve ramify in the portion that is actually contained in the scleral foramen, either forming a delicate network around the nerve bundles, or anastomosing with branches proceeding from the central artery. In such preparations, however, some branches are divided, on their way to pass backwards, along the nerve, or inwards towards the retina. In such preparations the great vascularity of the optic nerve is very remarkable, and in perfect injections, besides the larger vessels, a fine network may be seen surrounding each single nerve bundle.

By sections parallel with the course of the optic nerve, and carried through the latter and through the sclera, choroid, and retina, a better idea is gained of the distribution of the branches of the peri-neural wreath. It is seen that the central vessels

give off considerable branches to the optic nerve, which anastomose with the arteries of the internal neurilemma, and farther forward with those from the peri-neural wreath, and form the network pervading the structure of the nerve itself: a network that is directly continuous with the capillaries of the retina. The small arteries proceeding from the peri-neural wreath proceed partly forwards to the portion of nerve in front of the lamina cribrosa, partly backwards to the trunk. These vessels as I saw them, are too fine to be visible with the ophthalmoscope; and in several injected retinæ I found that all the vessels large enough to be so visible, proceeded from the central artery or vein. It does not follow that this should be so in all cases.

The longitudinal section through the nerve shews also a direct connection between the vessels of the choroid and those of the nerve disc. This is best seen by removing the sclera and retina, and leaving only the choroid with the nerve passing through it. In such preparations very numerous arterial and venous twiglets are seen; and the chorio-capillaris is immediately continuous with the fine vascular network of the nerve bundles.

It follows that a very intimate connection exists at the nerve entrance between the ciliary system, and the vessels of the nerve itself, and of the retina; and that the ciliary vessels are subservient to the nutrition of the disc and of its surrounding parts. The connection is, however, almost entirely arterial; and only in very small part venous. After very careful search I have never found veins corresponding to the arterial wreath. The veins of the sclera around the nerve receive no branches from the choroid or from the nerve itself. They pass directly into those of the external nerve sheath; and, near the nerve entrance, the communication between the veins of the external and internal sheaths is very small, although further back it is more extensive. From the choroid alone, a few venous twigs pass directly into the nerve.

It is remarkable that this extensive vascular connection should fail to produce any reparative collateral circulation in cases of complete embolia of the central artery of the retina; so that in such cases little or no improvement of sight is usual; and in Schneller's case only,* in which the obstruction was from the first incomplete, was the patient enabled again to read fine print. The explanation probably is that the vessels are too minute to undergo the necessary enlargement in time to preserve the retina from degenerative changes; and, when these have once taken place, no establishment of a collateral circulation can be expected. The vascular network described probably plays an important part in various pathological changes, concerning which our know-

* Arch. f. O., viii, 1, page 271.

ledge is still imperfect and fragmentary; and the very fineness and abundance of the vessels shew the activity with which the nutrition of the disc requires to be maintained.

The existence of a vascular connection between the retina and the choroid at the ora serrata has been hitherto denied, since it could not be discovered by injection, and since the passage of vessels through an epithelial pigment layer was *a priori* improbable. Kugel, however, has lately described an experiment in which he applied a firm ligature tightly round the optic nerve of a living dog. The retinal vessels were at first completely blanched. An hour or two afterwards they were refilled and even distended, in a direction from the periphery towards the centre. In four days the dog was killed, and near the ora serrata were found considerable vascular loops, from which fine vessels proceeded towards the ciliary body, "and established a connection between the vessels of the retina and those of the choroid and iris." Kugel does not appear to have seen this connection, but only to have inferred it. In estimating the value of the inference it is important to remember that the same phenomena have been observed by Rosow and others in the eyes of rabbits, after complete division of the optic nerve without injury to the posterior ciliary arteries and nerves; and that in rabbits the retina is in great part without vessels, these being arranged in two lateral bundles, and in these bundles terminating in loops before they reach the ora serrata. It is hence evident that Kugel's experiment fails to afford proof of his position, since similar results were produced under conditions incompatible with the truth of his hypothesis.

Unfortunately I have no injection of the human retina in which the vessels are filled to their very finest ramifications; but I have never, after the most careful examination, been able to detect any trace of a vascular connection between the retina and the choroid at the ora serrata. The phenomena observed after ligature or section of the optic nerve may probably be explained as follows:—The current of blood through the central artery being suddenly arrested, although no more blood is conveyed towards the eye, the efflux of blood continues for a time, on account of the contraction of the vessels. This does not proceed to their complete emptying, for, when the blood pressure in the veins is less than the intraocular pressure, the further efflux is checked. As already described, the vascular network at the optic disc is mainly arterial, and through this some afflux would continue; while, the efflux being suspended, the blood would accumulate at the periphery of the retina, where the small vessels would be less influenced by intraocular pressure than larger and more central ones.

The Vascular Distribution in the Choroid.—The choroid may be divided, as regards its arterial circulation, into two portions, a posterior or true choroid, chiefly supplied by the short posterior

ciliary arteries, and an anterior, the ciliary bodies and iris, supplied by the long posterior and the anterior ciliary arteries. These divisions are connected by numerous anastomoses. The greater part of the venous blood is carried away by the vasa vorticosa, which perforate the sclera at the equator, and receive branches from the choroid, the ciliary muscle and processes, and from the iris. A small part of the venous blood, chiefly from the ciliary muscle, finds exit through the anterior ciliary veins.

Arteries of the Choroid. 1. *The Short Posterior Ciliary.*—The short posterior ciliary arteries, about twenty in number, besides many smaller ones, proceeding from the peri-neural circlet, perforate the sclera at the posterior portion of the globe. In the choroid they are at first superficial, but ramify dichotomously and penetrate more deeply, until they are lost in the chorio-capillaris. The smaller have but a small field of distribution, while the larger pass forward even as far as to the ora serrata of the retina. Brücke, in his description of the human eyeball, besides the so-called "inner" branches going to the chorio-capillaris, mentions also "external" branches passing directly into veins without capillary intervention, and "anterior" branches, running close together to the ciliary processes and iris. Hence there was supposed to be, in the choroid, a double mode of transition from arterial to venous blood—by capillaries, and directly without capillaries. Such an arrangement seemed to be *a priori* improbable; and I have ascertained, beyond doubt, that it does not exist. My injections show that all the choroidal arteries terminate in the internal layer of capillary network. The meshes of this network are finest and nearly circular near the nerve entrance, and become gradually coarser and more oblong towards the periphery. The finest arteries and veins are commonly the centres of little stars of capillary vessels; so that the network is made up of such radiating figures. On account of the greater fineness and closeness of the posterior portion of the chorio-capillaris, it is manifest that it must be in relation with a greater number of arteries and veins than the anterior portion. We find, indeed, in the immediate vicinity of the nerve a prodigious number of small vessels, among which the veins, by reason of their large diameter, are more readily discernible than the arteries. Both have a very winding and peculiar course; as may sometimes be seen with the ophthalmoscope in cases of deficiency of epithelial and stroma pigment. Even in the best preparations, it is difficult to follow the vessels in this region, unless the arteries have been filled with a different colour from the veins. The great abundance of vessels rapidly diminishes in front of the macula lutea; and, at mid-distance between the equator and the nerve entrance, all the vessels of a good preparation can be followed with facility.

The short posterior ciliary arteries do not supply the whole of

the choroid. The anterior portions, from the neighbourhood of the equator, receive branches from the vessels of the anterior division—the anterior and the long posterior ciliary arteries. These vessels pass from the ciliary muscle in a direction at first directly backwards; then ramify dichotomously in the choroid, and either terminate in the chorio-capillaris, or by anastomoses with the branches of the short arteries. Haller (1754) and Zinn (1780) have accurately figured and described these backward coursing branches; but subsequent anatomists have failed to do so. The anastomoses of these branches form the only connections between the arteries of the choroid proper and those of the ciliary body and iris. The number of the branches varies, from ten to twelve or more, in inverse proportion to their calibre; and they run backwards for a determinate distance, equal to the width of several ciliary processes. The formerly described "anterior" branches of the short posterior ciliary arteries are partly these backward coursing vessels, but chiefly veins, which carry back the blood from the iris and ciliary processes to the choroid, and which may readily be followed into the vasa vorticosa by the aid of good injecting and moderate enlargement. While, therefore, the belief, formerly entertained, that the short posterior ciliary arteries sent forward numerous branches to the ciliary processes and the iris, must be abandoned; it is found also that the anterior and long posterior arteries send branches back to the choroid. It follows that the anterior division, the ciliary body, and the iris, is much less dependent for its blood supply upon the posterior division, the choroid proper, than it was supposed to be. The anastomoses described might enable the short posterior ciliary arteries to supply blood to the anterior division under exceptional circumstances; but these vessels do not ordinarily supply even the whole of the choroid proper.

2. *The Long Posterior and the Anterior Ciliary Arteries.*—The two long posterior ciliary arteries perforate the sclera very obliquely on the horizontal meridian, somewhat in front of the short posterior. Giving off no branches, they pass forward between the choroid and sclera as far as the ciliary muscle, where they each divide into two branches, which diverge from each other at an acute angle, enter the ciliary muscle, traverse it in a course oblique to their former one, and bend into the greater vascular circle of the iris. *The anterior ciliary arteries*, branches of the arteries of the recti muscles, and, in exceptional cases, of the palpebral arteries also, perforate the tendons of the recti to reach the sclera, pass over this usually in a very winding course, to the corneal margin, where they divide into numerous branches, the most and largest of which pierce the sclera. Their external branches, given to the sclera and conjunctiva, will be described hereafter. The perforating branches reach the ciliary muscle, and, together with the branches of the long posterior, form the

greater arterial circle of the iris. This is a *complete* wreath of vessels, situated in the ciliary muscle at the boundary separating it from the iris, and in places double or triple. From this wreath arteries proceed, *forwards*, to the iris, *inwards* to the ciliary processes, *backwards* to the ciliary muscle, and some farther backwards to the proper choroid. The arteries of the ciliary processes and iris spring often from short common stems, which divide into two branches, one for each of these structures. Besides the greater circle of the iris, the branches of the long posterior and of the anterior ciliary arteries form also an *incomplete* circle, or rather series of anastomoses, lying more deeply in the ciliary muscle, and from which proceed most of the arteries of the muscle itself, and most of the backward coursing branches to the choroid.

The ciliary muscle contains a large number of small arteries, which ramify in its structure, and form a very fine and close capillary network. In the outer part of the muscle, which consists of radiating fibres, the meshes of the network are mostly parallel to the fibres; in the inner part of the muscle the meshes, as shewn by perpendicular radial sections, are irregular and polygonal.

The arteries of the ciliary processes proceed from the greater circle of the iris, and possibly also from other branches of the long posterior and anterior ciliary arteries. They pass inwards from the muscle to the processes as short branches, and subdivide rapidly into a multitude of fine twigs, which anastomose freely, and, at the free margins of the processes, pass into the commencement of veins. The arterial branches are always finer than the venous; an appearance that I at first ascribed to imperfect filling. But, having found the same appearance at the marginal loops of the cornea, it is probably normal.

The arteries of the iris form on its inner surface a loose capillary net, and an extremely fine one at the sphincter pupillæ. Some branches form, at a definite distance from the pupillary margin, the smaller arterial circle of the iris. It is remarkable that the iris is very difficult to inject in adults, while the choroid may be injected easily. The reason may be that the arteries of the iris, which possess very thick walls, are strongly contracted after death by their elasticity, and oppose considerable resistance to the entrance of the fluid. In the eyes of children good injections of the iris are easy. At the margin of the pupil the finest arterial branches pass into the venous.

II. Veins of the Choroid.—1. *The Vasa Vorticosa.*—These large veins, of which there are usually five or six larger, and a variable number, from one to six, smaller, receive most of the blood from all parts of the choroid. Before their exit from the eye, the smaller trunks usually unite with the larger, so that more than six seldom pierce the sclera. They do so in the

equatorial region; and, like the long posterior ciliary arteries, in a very oblique direction, so as to form in the scleral tissue a canal several millimetres in length, with which the walls of the vein are closely united. It is not impossible that this arrangement may, under certain circumstances, maintain and increase a heightened tension of the eyeball, however arising. Since the sclera at the site of the venous canal is reduced to its minimum of thickness, and can scarcely possess enough strength to protect the inclosed vein against an increase of pressure, it may follow that such increase would close the vein like a valve, and thus, by the retarded efflux of blood, produce in its turn a greater pressure. Upon the long ciliary arteries there would be less of this influence; and the tension must be very considerable before it would begin to affect them. Whether such occurrences actually take place or not, can only be determined by direct experiment.

All the choroidal veins leave the eyeball in the region of the equator. The small posterior ciliary veins, which are found at the back part of the globe, receive blood only from the sclera. There are no veins in the choroid that correspond in their course to the long ciliary arteries; although the existence of such has been generally assumed, and they have even been figured. The veins in the choroid form the well known *vortices*, in which the central trunk receives vessels from all sides, and in which the branches of neighbouring vortices inosculate. Between two vortices a vein usually passes from before backwards, not opening direcely into either, but into the first branch of communication between them. This seems to be the foundation of Arnold's figure in his Icones, representing a vein passing forward to the ciliary muscle, and having no special exit from the sclera. Zinn, on the contrary, makes his long ciliary veins commence in the ciliary muscle, receive twigs from the iris, and accompany the long ciliary arteries. For this I can find no foundation, excepting that two veins from the ciliary muscle sometimes accompany the branches of the long ciliary artery for a short distance, and then unite in a common trunk, which always, however, at the posterior margin of the ciliary muscle, opens into one of the branches of a vortex.

The venous branches coming to the vortices from behind allow the short ciliary arteries to lie for a space between and parallel to them; and in the most posterior portion of the choroid it is scarcely possible to distinguish the two kinds of vessels from each other. Their intimate and close connection may serve in some degree to regulate the flow of blood. If, for example, a somewhat large quantity was driven into the arteries, the veins would experience a stronger pressure, in a direction from behind forwards, by which the outflow of venous blood must be promoted. Inversely, if from venous obstruction the arteries were

compressed in a direction from before backwards, an obstacle to the afflux of blood would be produced. In this way it is possible that small inequalities of the blood current may be neutralized, and that considerable oscillations in the blood contents of the eyeball may be prevented. The veins which come to the vortices from before receive blood from the iris, the ciliary muscle and processes, and the anterior portion of the choroid.

The veins of the iris, as far as I could observe, all pass backwards between the ciliary processes, to the numerous veins in the smooth part of the latter; which also receive the veins of the processes themselves, and some of those of the ciliary muscle. I never saw veins pass directly outwards from the iris to Schlemm's canal; nor from the canal outwards through the ciliary muscle; but I have seen veins pass outwards from the vascular net of the muscle itself. But the vessels of the iris, of the ciliary muscle, and of the processes are so often and so intimately connected, that blood may perhaps pass forwards from the iris through the muscle. The vascular net of the iris passes directly into that of the processes.

The veins of the ciliary processes arise from their vascular network, and a larger vein usually emerges from the free margins of the processes. In the interspaces of the processes lie the veins coming from the iris, and form with those of the processes a venous network, that lies immediately beneath the internal surface, and the trunks from which pass through the smooth part of the processes to the choroid, first to its anterior margin, and then onwards to its external surface. The veins of the ciliary processes and iris are therefore wholly within the ciliary muscle, do not pass through it, and are quite withdrawn from its action; while all arteries to these parts pass through the muscle, and, from the direction of its fibres, must be compressed by its contraction. We should therefore expect that in accommodation for the near point the blood contained in the ciliary muscle would diminish; the afflux being checked and the efflux unimpeded. It is well known that the contrary has usually been assumed, namely, that the contraction of the ciliary muscle would produce a blood stasis in the processes. This, however, the arrangement of the vessels seems to render impossible. Very lately O. Becker has observed, in the eyes of several albinoes, that the ciliary processes, the summits of which could be seen through the iris, were shorter in near accommodation, and more prominent under the influence of atropine. Becker explained these appearances chiefly by the coincident changes in the diameter of the pupil. In dilated pupil the iris would not be capable of receiving so much blood as when the pupil was small. On account of the intimate vascular union between the iris and processes, a part of the blood of the former, expelled during the action of atropine, would be driven into the latter; and the contrary result would follow when the

pupil contracted in accommodation. That such a correlation may exist between the iris and the processes seems probable; but the exact action of the ciliary muscle upon the vessels passing through it is a matter that requires further examination. I am content for the present to point out an arrangement that appears to me not to be unimportant.

The veins of the ciliary muscle proceed partly from the posterior margin and inner surface of the muscle as small trunks going to the veins of the processes, and, when united with these, passing into the vortices. As already mentioned, some of the veins sometimes accompany for a space the circular branches of the long ciliary artery, but still empty themselves into a vortex. Besides these, another portion leave the anterior margin of the muscle, and pass through the sclera to the anterior ciliary veins.

2. *The Anterior Ciliary Veins.*—The existence of an anterior channel of exit for venous blood from the choroid has been assumed by most anatomists and ophthalmic surgeons. The latter, indeed, supported by clinical observation, maintained that distension of the veins passing over the sclera was very often observed in hyperæmia or inflammation of the choroid. There was a want of unanimity only with regard to the mode of exit of the veins, and upon the question whether they passed out from the iris, as well as from the ciliary muscle, and whether their exit was direct, or that the veins emptied themselves into Schlemm's canal, and from this branches passed outwards. Rouget, on the contrary, entirely denied the existence of any anterior channel of exit for the venous blood of the choroid. He declared that all the choroidal veins emptied themselves by the vortices; and that Schlemm's canal, both in man and in animals, was only a circular venous plexus in the sclera, perfectly unconnected with the vessels of the choroid.

My own researches have been upon human eyes only; and they confirm those of Rouget on one point, that the so-called Schlemm's canal is really a venous plexus, but not on another, that it has no connection with the vessels of the choroid. I have found the plexus to be differently constituted in different parts of its circle, consisting for a short distance of six or seven veins of about equal size, formed into a network by connecting branches, then of two large and several small veins, sometimes of one large and several small. In the latter case the large vessel has a calibre of about 0·225 mm. There is therefore no circular canal, but only a circular plexus of veins in the innermost layer of the sclera, immediately external to the insertion of the ciliary muscle. This plexus would be most simply named Plexus ciliaris venosus. At several points it receives small veins, which issue from the ciliary muscle near its anterior margin. These are often accompanied, at their issue from the muscle, by a small perforating artery, pursue for a short distance a very tortuous course upon

the sclera, and receive from its innermost layer small veins, which have there formed a loose irregular network of very fine vessels. They then, at a short distance from the ciliary plexus, divide into several twigs, which freely inosculate, some of them opening into the plexus, others passing outwards through the sclera, to communicate with its superficial venous net. Since, immediately before opening into the plexus, they divide into several branches, they practically form, at their places of entrance, looser continuations of the plexus in a backward direction; and from these arise the venous branches that pass outwards. In a single eye I counted from 18 to 20 of such entrance places. The compact part of the plexus receives no vessels, either by its outer or inner surface; they are received only at the posterior margin in the manner above described. The veins from the outer parts do not therefore directly enter the plexus formerly known as Schlemm's canal; but they enter its prolongations backwards at the places of entrance of the veins of the ciliary muscle. The blood from the ciliary muscle may therefore partly flow in a direction directly outwards; partly into the ciliary plexus which serves as a reservoir. At every entrance place of a vein from the ciliary muscle, several veins pass outwards through the sclera, some of them sometimes of considerable calibre, and at these places the deep plexus becomes practically continuous, through the sclera, with the episcleral network of the anterior ciliary veins. We see also in sections that the sclera is far richer in vessels at its most anterior portion than elsewhere, where large vessels are found only upon its surface; and this anterior vascularity is due to the veins of the ciliary plexus that pass outwards. They pass through the sclera mostly backwards and outwards; but sometimes vessels are seen going obliquely forwards to meet the veins of the margin of the cornea, and to establish a direct union between these and the deep plexus.

The existence of an outlet for the venous blood of the choroid through the anterior ciliary veins is thus rendered certain, and the differences in the descriptions given by previous observers may be explained by supposing that they had traced out only parts of the actual arrangement. The anterior efflux of blood differs, however, from the afflux through the anterior ciliary arteries, in its much smaller amount. Only a small portion of the blood brought by the anterior ciliary arteries is carried back by the anterior ciliary veins, and the united trunks of the latter are smaller than those of the former. The greater part of the blood brought by the anterior ciliary arteries is carried away through the vortices. This, however, does not prevent the anterior outlet from coming into prominence in pathological conditions, in which the outlet through the vortices is from any cause impeded. Thus we find the anterior ciliary veins dilated in hyperæmia and inflammation of the choroid, when these are not

very chronic; but it may be doubted whether this dilatation is a result of increased collateral outflow, or of inflammatory irritation. The former is the most ready explanation of the great distension of the anterior ciliary veins in chronic and complete glaucoma; since, as I have already observed, the strong intra-ocular pressure may impede the outflow through the vortex veins, and force the blood to seek the anterior channels.

The combination of the ciliary plexus with this anterior outlet forms a very remarkable and important provision. The plexus serves as a reservoir, placed at the anterior extremity of the muscle, and into which venous blood may flow, when squeezed out of the muscle by its contraction, and from which it may return when the contraction ceases. The great vascularity of the muscle seems to render such a provision highly intelligible; although, as long as there is no unity of opinion with regard to the function of the muscle itself, it is very difficult to speak certainly upon the point. It seems to me certain, as a matter of anatomical position, that the action of the ciliary muscle must exert an influence upon the vessels of the plexus.

The External Blood-vessels of the Eye.—In so far as the eye-ball is covered by conjunctiva, we must recognize two external layers of vessels—a superficial, the vessels of the conjunctiva and of the sub-conjunctival tissue; and a deep, the extension of the anterior ciliary vessels upon the sclera.

The vessels of the peripheral part of the scleral conjunctiva proceed from the vessels of the eyelids. They are in their ramifications almost wholly distinct from the subjacent anterior ciliary vessels, and only isolated branches of the latter pass into the conjunctiva. In the annulus conjunctivæ, on the contrary, a great number of small arterial and venous loops pass into the conjunctiva and ramify backwards, in order to supply the innermost zone of the conjunctiva, and to anastomose with the peripheral vessels.

I. The Anterior Ciliary Vessels.—1. *The Anterior Ciliary Arteries.*—As already mentioned, the anterior ciliary arteries proceed from the arteries of the recti muscles, and perforate the tendons to reach the sclera. Commonly two branches are given on the upper, inner, and lower sides; and only one on the outer, that one being usually small. They pursue a winding course towards the margin of the cornea, and at some distance from it divide into several branches, which, after giving off fine episcleral twigs, perforate the sclera vertically. Two adjacent arteries often unite to form a loop, from which perforating branches are given off. Besides these muscular arteries, an anterior ciliary branch is occasionally given off by a palpebral artery, and traverses the conjunctiva nearly to the margin of the cornea, where it sinks to perforate the sclera. Zinn described such a vessel, and so also has van Woerden, but I have not

seen it myself in any injected eye. Van Woerden describes it as being readily recognizable in the living subject, almost always on the outer side, mostly a little towards the lower part, as a straight, bright red vessel, giving off no branches, traversing the conjunctiva nearly to the corneal margin, and there piercing the sclera. It should be found in about one out of four persons. I examined more than a dozen, however, before I found a vessel to correspond to the description.

The trunks of the anterior ciliary arteries are very clearly visible in healthy eyes, and are usually the most conspicuous vessels. They may sometimes be seen to issue from the tendon; and may be followed along their whole course to their place of perforation. Their colour is more carmine than bright red, being somewhat veiled by the conjunctiva covering them. They are thus readily distinguishable from the superficial cinnabar red vessels of the conjunctiva; and, moreover, the conjunctiva is movable over them, while they are themselves only somewhat movable with the subconjunctival tissue, in the most external portion of their visible course. That they are arteries may be shown by the speed with which they refill, and by the direction of the incoming current, when they have been emptied by pressure through the eyelid. They are also distinguished from the ciliary veins by their winding course and their very visible perforating branches. The places of perforation of the latter are commonly rich in stellate pigment cells, which give the appearance of a dark border around the vessel.

With the naked eye we see no other branches of the anterior ciliary arteries than the perforating ones, but we see also, as van Woerden rightly observes, that they become continually finer towards the corneal margin. Only here and there a small twig may be seen to leave them, and to lose itself on the scleral surface. There are, however, numerous episcleral branches, which, at the peripheral parts of the sclera, are concealed by the thickness and opacity of the conjunctiva, and which, nearer the corneal margin, are too fine to be clearly visible, even when the conjunctiva is thin. The episcleral branches form upon the sclera a rather open network, from which the likewise open network of the scleral capillaries proceeds. The fine arterial twigs may be distinguished from veins by their more winding course. The branches that extend farthest backwards anastomose with the anterior scleral branches of the posterior ciliary arteries.

At the margin of the cornea the episcleral vascular system undergoes a greater development. The episcleral branches of the anterior ciliary arteries here bend laterally, and unite to follow, in the annulus conjunctivæ, a course nearly parallel to the corneal margin. They form together anastomosing loops, from the anterior aspect of which fine vessels are given off at regular distances, to form the marginal vascular network of the cornea,

and to supply a number of twigs to the conjunctiva. Sometimes the anastomosing branches in the annulus are large enough to be seen in the living eye, but this is not the rule. By following them with the microscope it is found that, besides the larger, a number of small twigs become visible.

Before proceeding to describe farther the course of the vessels, I must make some observations upon the margin of the cornea. The so-called annulus conjunctivæ, that is, the marginal part of the conjunctiva still possessing submucous tissue, extends a certain distance over the margin of the cornea, and extends further above and below than on either side. The cornea, viewed from the front, appears therefore as a recumbent ellipse, while its posterior boundary, the edge of the ciliary plexus, is always circular. The tunica propria of the scleral conjunctiva passes over into Bowman's membrane, not abruptly, but through a narrow zone in which the conjunctiva is no longer movable, and therefore has no subconjunctival tissue, but still is not homogeneous, and appears fibrillated. In this zone it is scarcely possible to distinguish, in microscopic sections, the conjunctiva from the subjacent cornea. On the surface Bowman's membrane appears to extend somewhat outwards, while the deeper parts are still fibrillated. The fine vascular network extends about as far over the cornea as this marginal zone extends, and then terminates in capillary loops. It is difficult to say that these vessels are in the conjunctiva, since this can hardly be distinguished from the cornea, but it can be said that they are in the most superficial layer.

The before-mentioned fine arteries, that pass over on to the corneal margin at equal distances from one another, and that I call the arterial mother-vessels of the network of marginal loops, are continued in the limbus conjunctivæ and in the marginal zone of the cornea by repeated dichotomous division, so as to form a network of very fine meshes, with acute-angled interstices. The arteries are here distinguishable by their unusual fineness, and have an unusually rectilinear course. The mother vessels of a well injected preparation may be seen by the naked eye, but their fine divisions cannot be distinguished without a lens. The fine divisions of the arteries are usually accompanied by veins running a similar course, and they repeat, on a small scale, the plan of formation from which they spring, forming loops, and giving off finer vessels from them. The smallest arteries form winding curves, and, gradually dilating, pass into veins. There are generally several rows of loops one before another, the most external forming the peculiar marginal loops in the clearest manner. The recurrent venous limb of the loop is always considerably thicker—in my injections at least twice as thick—as the arterial limb. It has already been said that this vascular network extends about as far inwards as the fibril-

lation of the conjunctiva; and farther inwards, upon the true cornea, no vessels are found.

It would lead me too far if I were to enter into the arguments for and against the existence of the so-called serous vessels of the cornea, and I will only give the results of my own observations. I could never, in the most successful injections of normal eyes, even those of children, in which the marginal loops could be fully distended, discover any vessels in the cornea; and, moreover, the marginal vessels are themselves so fine that they would only suffice for the supply of their own loops, and not for vessels extending farther inwards. In apparently normal eyes I found vessels extending as far as the middle of the cornea, but in these cases always obtained proof, by fine sections, of the existence of pathological changes, by which such vessels had been newly formed; so that they were not parts of the normal corneal structure.

It has hitherto commonly been assumed that the vascular loops of the corneal margin were formed from the conjunctival vessels, while they are, in fact, given off from the ciliary arteries. Indeed the reverse of the first proposition is more true—that the conjunctiva immediately around the cornea receives its vessels from the ciliary system. Numerous vessels pass from the mother-arteries of the marginal loops into the conjunctiva, at a distance of from one-third to one-half a millimetre apart, pursue a backward course, ramify and subdivide in an inner zone of conjunctiva three or four millimetres in breadth, and anastomose with the peripheral conjunctival arteries. These vessels correspond with the *anterior conjunctival vessels* of van Woerden, and I will call them anterior conjunctival arteries. They are mostly very fine, so that in the normal eye they cannot be seen until magnified. They then become visible at the inner margin of the annulus conjunctivæ, ascending from the deeper parts, and having usually a course of three or four millimetres. Farther away from the cornea they become larger, and farther away still only single vessels ascend, of which the larger may be recognized with a lens in a healthy living eye, since they are nearly always accompanied by veins of similar course and larger size, which may themselves often be seen by the naked eye. These are obviously the anterior conjunctival of van Woerden, who, on account of their fineness, overlooked the corresponding arteries.

2. *The anterior ciliary veins*, like the arteries, are branches of the vessels of the recti muscles. Their trunks correspond with the arteries in their course, not exactly, but generally. There are sometimes more, as two or three, for each muscle; while there are never more than two arteries. The episcleral branches commonly accompany the corresponding arteries, one on each side. Since the anterior ciliary veins only bring back a portion of the blood that the anterior ciliary arteries convey, it follows

that the veins are much smaller than the arteries. These veins are the *episcleral vessels* of van Woerden, about which he certainly assumed that they were mostly veins, but yet suspected that some were arteries. During life they are not visible in all persons, but chiefly in those with a thin conjunctiva and somewhat hyperæmic eyes. In irritation of the eyes they become very conspicuous and much dilated, even only from rubbing the eyes with their own lids, and much more when any foreign body is present in the conjunctival sac, or impacted in the cornea. In these vessels the same branches can be distinguished as in the arteries, namely: 1. branches from the capillary network of the sclera; 2. to the marginal network of the cornea; 3. anterior conjunctival veins; 4. perforating branches.

The trunks of the anterior ciliary veins divide near their origin into several branches, which ramify in an arborescent manner over the sclera, and which form loops near the cornea after the manner of the arteries, but somewhat farther from the corneal margin. These loops, like the arterial loops, send forth twigs, running over the margin; the venous mother vessels of the network of marginal loops. The veins have, during life, the same carmine-tint as the arteries, and are chiefly to be distinguished from the latter by their greater diameter and their less winding course. All the branches of the anterior ciliary veins lie immediately upon the sclera, and are connected together by a network of fine polygonal meshes, which become gradually larger the more distant they are from the cornea. The arteries form, in the same part of the sclera, the already-described far looser network, in which they are commonly accompanied by two veins. The episcleral venous network is, therefore, not a capillary net, but a net of venous anastomoses, like the ciliary plexus, with which it is in intimate connection. In normal eyes it is not visible, but in irritated eyes it becomes apparent, although not so much so as the larger branches of the anterior ciliary vessels. It is seen very well in cases of iritis and of other deep ophthalmiæ, producing the well-known deep-seated zone of bluish-redness that surrounds the cornea, and that can never be completely resolved into individual vessels. The venous mother-vessels of the network of marginal loops pass over the corneal margin, and are connected together by a continuation of the episcleral venous net, with still finer meshes. The finer twigs are accompanied by still finer arteries, and form loops, from which proceed the finest twigs that pass over into arteries in the manner already described.

The anterior conjunctival veins are formed, like the arteries, by loop-shaped branchings of the venous twigs in the annulus conjunctivæ; and, as van Woerden correctly states, may be clearly seen in the living eye, where a superficial bright-red vessel may be seen to change by a winding course into deep carmine. Soon

after their origin they approach, and afterwards accompany, a conjunctival artery. They form the greater part of van Woerden's anterior conjunctival vessels; since the arteries are mostly too fine to be seen by the naked eye. Of the veins themselves only the largest are visible in normal eyes; and hence van Woerden greatly understated their numbers. Vessels exceeding a certain degree of fineness are no longer visible; probably for the reason given by Liebreich, to explain why the chorio-capillaris of the human eye cannot be seen with the opthalmoscope; namely, that the small quantity of blood contained in them does not carry sufficient colouring matter to define them sharply from their surroundings. The anterior conjunctival veins correspond entirely in origin, number, and course, with the arteries; and, like them, form connections with the posterior conjunctival vessels, into which they sometimes seem to empty themselves. Often such inosculations are so large as to give an appearance as if the posterior conjunctival vein formed the outlet for the blood from the marginal loops, or even from the interior of the eye. Such an appearance corresponds with the presence of an anterior ciliary artery coursing through the conjunctiva, and is only exceptional. As a rule, the anterior conjunctival veins discharge their blood into the ciliary veins. The branches between the anterior ciliary veins and the ciliary plexus and muscle, have already been accurately described. Some of the outcoming veins from the latter are sometimes very considerable; so that they appear on the sclera as large veins coming from the deeper parts. Van Woerden points out that during life such branches are mostly seen near the corneal margin, having a dark colour, and appearing to come from the interior of the eye. He also points out the connection between such branches and the fine vascular wreath around the cornea.

Of these deep branches also, although they are regularly present around the whole circumference of the eye, only a part are visible; the rest not being thick enough to be seen through the conjunctiva. In a case of chronic cyclitis I saw these deep branches of the anterior ciliary vein very clearly and in numbers; while the injection of the mother-vessels of the margin was less pronounced. Van Woerden states that in cyclitis the injection of the corneal margin is wider and stronger, and appears more deeply situated than in iritis, a result that may depend upon the branches of the anterior ciliary veins that pass through the sclera being more distended.

II. The Posterior or proper Conjunctival Vessels.—The peripheral parts of the scleral conjunctiva, and of the sub-conjunctival tissue, obtain their blood from the palpebral and lacrymal vessels. These may be seen at the reflection of the conjunctiva, or in the scleral portion, as small, bright red, slightly winding trunks, that can be moved with the conjunctiva, and that pass

forwards. They form by their branches little loops, from the convexities of which other and finer vessels arise. As with the anterior vessels, each fine artery is usually attended by a somewhat thicker vein; and often there is a vein on both sides of the artery. Both arteries and veins anastomose with the anterior system, at about four millimetres from the cornea, in the manner already described. These vessels can usually be clearly seen in the normal eye, although the arteries require careful looking for. These are the vessels that become injected in catarrhal ophthalmia. They form a capillary network, lax in the proper scleral conjunctiva, but much more dense at the reflection. It is not possible, as van Woerden also observes, that simple hyperæmia of these vessels should make the eye *deep red*.

Of the external vessels of the eye, we therefore see in the living only a portion; namely, first, the anterior ciliary arteries with their larger perforating and with indications of their episcleral branches; the anterior ciliary veins only occasionally, but always when the eye is irritated, in which case their trunks and larger branches, their branches to the network of marginal loops, their larger perforating branches, and a portion of the episcleral venous network, all become recognizable, as well as the posterior and the larger of the anterior conjunctival veins, and sometimes the accompanying arteries. All conjunctival vessels, whether arteries or veins, are distinguished by their bright cinnabar-red colour, although the network of corneal marginal loops, which in irritated or inflamed eyes are sometimes much filled, is also bright red. Between the arteries and veins of the conjunctiva no difference of colour can be perceived. All sub-conjunctival vessels, however, are carmine-red, be they arteries or veins. The difference of colour depends chiefly upon the deep vessels being covered by conjunctiva, and, perhaps, partly, as van Woerden suggests, upon the action of the atmosphere upon the blood in the more superficial.

In pathological conditions, portions of the external vascular system of the eyes are often more distended, so that vessels naturally invisible are brought into view. Such vascular injection, when it does not depend upon the formation of new vessels, is chiefly venous. The arteries are so fine, and their development, as it appears, so much less considerable, that they contribute comparatively little to the apparent hyperæmia. Further observations are required to determine whether the arteries, in many cases, are actually dilated or not.

In inflammations of the eye, therefore, there are chiefly three kinds of vessels distended. 1. *The posterior conjunctival*, which are injected in catarrhal disorders, and of which the veins are chiefly influenced. 2. *The anterior ciliary veins and the episcleral venous net.* The injection of these vessels may be either partial or more general, and the branches proceeding from the network of mar-

ginal loops may also be distended, as well as the deeper ones coming through the sclera. This kind of injection is seen in phlyctenulæ, and in affections of the cornea and of the inner ocular membranes, when these are not entirely chronic. The episcleral venous network becomes especially filled in acute iritis and in cyclitis. Since the anterior ciliary veins course over the surface of the sclera, the conjunctiva can be moved to and fro over them.

3. *The anterior conjunctival vessels and the marginal loops of the cornea.* Injection of these vessels is almost always accompanied by injection of the anterior ciliary veins, although the latter may be injected without the anterior conjunctival vessels participating. The aspect of the injection at the corneal margin in such cases is therefore mixed, and is produced on the one hand by the greater fulness of the episcleral venous net, which shows through the conjunctiva; and, secondly, by the injection of the thence arising anterior conjunctival veins, and even of their arteries. In such cases we also see, by microscopic examination, the marginal loops very strongly injected, although it is seldom possible to make out the arterial branches of the network, that are seen extremely well in preparations. The unsteadiness of the patient, and the ready lacrymation of the irritated eye, are the chief impediments; but by continued examination and practice, more and more of the vessels may be brought into view. This third form of injection is best seen in cases of slight central corneal infiltration, and of foreign bodies in the cornea. The more strongly injected network of marginal loops appears as a very fine red zone, surrounding the cornea, from which proceeds outwards a very fine radiating striation (the anterior conjunctival vessels). This is seated in the conjunctiva, but is not very movable, on account of the adhesion of the conjunctiva at this point to the subjacent tissues. Still further outwards are the larger anterior conjunctival veins, springing from the episcleral network.

Different appearances of the ciliary injection at the margin of the cornea may depend upon the conjunctiva of the limbus being more or less swollen. Serous infiltration in this region may almost entirely conceal the episcleral veins or even the beginning of the loops, so that only the superficial injection of the conjunctiva shall be visible. With abatement of such swelling the state of the vessels becomes more apparent.

In phlyctenulæ of the margin of the cornea we always see several posterior conjunctival vessels continued to the margin, and there dividing into branches. The anastomoses between the anterior and posterior vessels are therefore dilated, and a kind of bridge is made between the conjunctival and the ciliary vascular systems.

The cornea, as I have already stated, possesses no vessels in its normal condition; but in pathological states we often see in it new vascular formations, proceeding from the vessels of the mar-

gin. Under certain circumstances such new formations occur with great rapidity, so as to lead to the belief that they are dilatations of pre-existing serous vessels. In other morbid processes in the cornea no vessels are formed during a long period; especially when such processes have a destructive character. The appearance of vessels is then an indication of improvement. It seems as if the formation of vessels depended chiefly upon the greater or less degree of nervous irritation accompanying the pathological process concerned. Thus in slight turbidity of the cornea with active vascular formation we see symptoms of much irritation, ciliary neurosis, photophobia, and lacrymation; while in the so-called passive purulent infiltrations of the cornea there are neither symptoms of irritation nor formation of vessels. It seems therefore that the degree and extent of the corneal structural change has less influence on the formation of vessels than the nervous irritation set up by the primary disease.

Since the entire circumference of the cornea receives twigs from the ciliary vessels, those that are prolonged over the cornea can only arise from the same source. The only differences between different corneal vascular formations will be, therefore, that they may arise from different branches of the ciliary system. Thus the branches of the network of marginal loops may be prolonged over the surface of the cornea; or the larger vessels of the annulus; while deeper vessels in the cornea may be prolongations of the deep scleral vessels, or of the veins of the ciliary plexus.

It appears also, that the form of the new vessels in the cornea is the expression chiefly of the nature and course of the pathological processes underlying their development; and depends upon these, rather than upon the branches from which they spring. Thus, among the superficial vascular formations, we distinguish pannus from the tuft-shaped varieties of keratitis. In pannus there are superficial, slightly winding vessels, that spread in an arborescent manner, among very turbid tissue. In the tuft-shaped keratitis, on the contrary, closely packed straight vessels, ending sharply in loops, and with the infiltration commencing where they terminate. In a case of trachomatous pannus, that I carefully examined, the mother vessels of the marginal loops were prolonged for some distance into the cornea, and between them were others less prolonged. There was thus a loose continuation of the network of marginal loops inwards, in many places not easy to discover. Besides these fine vessels ran a very marked one from above to beyond the centre of the cornea, slightly winding and arborescent. This was a vein, and near it was a very fine artery. The vein sprang from the annulus conjunctivæ, from a branch of the anterior ciliary veins, which also, at the same spot, received from the other side a large anterior conjunctival vein. Two small vessels of similar

course extended into the cornea from below. In phlyctenular vascular bandlets again, the vessels pass on to the cornea only from the mother vessels of the net-work of marginal loops, and as far as the origin of vessels is concerned, pannus would be distinguished from phlyctenulæ chiefly because in the former still larger vessels would be continued into the cornea from the larger branches of the anterior ciliary vessels in the annulus conjunctivæ. In fact, however, the actual distinction is that in the tuft-shaped keratitis the vessels grow quickly and are behind a circumscribed infiltration, while in pannus the inflamed surface is more extensive, and the irritation not so acute, but more lasting.

With regard to vascular formations in the deeper parts of the cornea, they may occur in all layers. I have observed one case in which winding continuations of the veins of the ciliary plexus passed into the deepest corneal layers. Since very fine arteries are found in the marginal portion of the sclera, even in its deepest layers, it is possible that these arteries may throw continuations into the cornea. As a concluding observation I would remark that a formation of new vessels is often seen in the conjunctiva, the sub-conjunctival tissue, and on the surface of the sclera as results of inflamation. The capillary network of the sclera has meshes so wide, that even a very considerable increase of its vessels would produce no great redness of its surface. In the not uncommon cases, in which the conjunctiva is so much injected as to resemble a red cloth, a formation of new vessels must be assumed; and I possess injections from such cases, in which the conjunctiva is pervaded by an abundant net-work of very wide capillaries. In much slighter degrees of injection the formation of new vessels has appeared to me to play an important part. In some injections of diseased eyes I have been able to reproduce almost the exact picture of the condition during life; and on closer examination of such cases I not only found the vessels dilated, but also much more numerous than in the most complete injections of healthy eyes. I must return to this subject in future, when I have examined pathological vascular formations with more exactness.

UPON THE INFLUENCE OF INTRAOCULAR PRESSURE UPON THE CIRCULATION IN THE EYE.

By Dr. Mitrophan Memorsky (*Arch. f. O.*, xi, 2, p. 84). ABSTRACT.

THE author commences by mentioning that the course of the blood is governed by special laws in certain organs, as in the liver, the spleen, and the brain. Until the invention of the ophthalmoscope it was not known that the eye must be included among them. The pulsation of the central vein of the retina is sufficient to show the necessity. This characteristic peculiarity

has attracted the attention of many inquirers during the last decennium, and especially of Donders.

A second peculiarity of the intra-ocular circulation arises from the division of the blood-vessels in the eye. Tirsch, Brücke, and Schroeder van der Kolk had pointed out the existence of two independent vascular systems, the ciliary and the retinal. Donders has sought to explain the physiological relations of the two systems by the hypothesis that they serve to regulate each other. It cannot be said that the hæmostatics of the eye were by this sufficiently explained; and it is, for example, wholly unknown what is the influence of disturbances of the general circulation upon the circulation within the eye, or of disturbances of the circulation in neighbouring organs, or in the vessels between the eye and the heart.

It must be admitted that the disturbances of the ocular circulation have not been treated with sufficient clearness by writers; hyperæmia of the choroid, for example, having been assumed to exist on the ground of analogy, and in the belief that hyperæmia is possible wherever there are blood vessels. We shall see that this rule is not without exceptions.

After briefly alluding to the experiments of Kussmaul and Schneller, the author proceeds to describe his own. The animals employed were, excepting the rabbits, narcotized by the injection of opium into their veins, and at the same time the pupils were kept dilated by atropine. The vessels, arterial or venous, that were experimented with, were laid bare, and surrounded by loops of twine, that were not knotted, but tightened by an assistant at any time. The fundus of the eye was observed through a three inch lens. An ophthalmoscopic micrometer was not employed, on account of the insuperable optical and mechanical difficulties—difficulties by which, as the author clearly shows, the very precise statements of Schneller are deprived of all value.

Kussmaul simply compressed with the finger the carotid artery of a rabbit, and found that the *fundus oculi* on the side compressed became somewhat paler. He then tied first one carotid, then both, and lastly the innominate artery; and found in all these cases a regular pallor of the fundus, corresponding with the anæmia of the brain. The author repeated this experiment both on dogs and rabbits, and found:—

In permanent or intermittent interruption of the flow of blood by ligature of the carotid, an interruption of the current of the *central artery of the retina was produced for one moment only*, and was so inconsiderable as easily to escape notice. Afterwards the current went on as usual. The same result was produced by deligation (temporary or permanent) of both carotids in dogs. In two rabbits, similarly treated, there was *no* interruption of the current of the central artery of the retina, and consequently no bleaching of the

fundus. This led to the suspicion that the sources of supply to the eyes were through the vertebral arteries. In two dogs, therefore, the innominate artery was tied (this, in dogs, gives off the two carotids, and the right subclavian with the corresponding vertebral). A loop was then cast round the left subclavian, below the origin of the left vertebral. It was found that the left vertebral alone was sufficient to maintain the ocular blood supply undiminished; but when this artery was closed by tightening the loop below its origin, the eyes became quite bloodless. When the loop was relaxed, the vessels began slowly and gradually to refill.

As a general rule, the hæmostatics of the rabbit's eye were influenced with difficulty. In young dogs, on the contrary, the ligature of one carotid was sufficient to produce pallor of the corresponding fundus, lasting perhaps half a minute.

There seemed more interest in similar experiments upon the veins; since the author hoped to obtain some proof of the soundness of Donders' very probable hypothesis about the relations between the ciliary and the retinal systems. In dogs and rabbits the veins are very well placed for such experiments. The anterior facial vein, the immediate continuation of the external jugular, passes from the neck to the chin, over the edge of the lower jaw, along the border of the masseter, to the orbit, and dips into the orbit, after winding round its inferior margin. It then ascends along the inner margin of the orbit to the brow, and passes on to the nose, where it unites with the vein of the other side. On entering the orbit it receives a branch that comes from the base of the skull, through the optic foramen, along the posterior wall of the orbit. Into this branch open the ciliary veins, that perforate the posterior segment of the sclera. In the course of the anterior facial along the inner and anterior wall of the orbit, it receives the ciliary veins that perforate the sclera on the same side. Veins proceeding from the outer side of the eye unite directly with the temporal vein, so that all the ciliary veins in these animals are parts of the external jugular system. The central vein of the retina opens into the cavernous sinus.

It is therefore possible to arrest the flow of blood in the veins of the ciliary system without interfering with the flow in the retinal system; and, according to the hypothesis, an increase in the blood of the first system would be attended by a diminution of the blood in the second.

A loop was put around one of the external jugular veins (both in dogs and rabbits the same results were obtained), and was kept tight from a few seconds to a minute. Instead of the expected emptying of the retinal veins, not the slightest change in them was produced. In rabbits the vessels of the choroid and the colour of the fundus remained unaltered. Attributing this to the free anastomosis between the veins of the two sides, the

author tied both of them at the same moment. The result was still negative. Doubting the correctness of his anatomical researches, and supposing that some of the ciliary veins might open into the internal jugular, the author tied all four jugular veins at once. The intraocular appearances still underwent no change. The next experiment was an endeavour to tie the spinal veins; and this failing, a loop was thrown around the upper extremity of the superior cava of a dog, and all descent of blood from the head at once arrested. The loop was kept tight for a minute, and neither at the time of tightening, nor during the period of constriction, nor when the loop was relaxed, was there the slightest change in the diameter or fulness of the central vessels. The experiment was repeated on a white rabbit, with the same result; and the author concludes *that the eye is a sphere filled with fluid in such a manner that the pressure exercised upon it by the complete arrest of its venous current does not suffice to render it any fuller than before.* He is of opinion that this fact is of great physiological and pathological importance. It proves, first, that the structure of the eye is concerned in the regulation of its circulation; and, secondly, that hyperæmia of any of the vitreous membranes, apart from prior or simultaneous pathological change —purely mechanical hyperæmia—is an impossibility.

In order to establish this fact with scientific certainty it is necessary to determine the conditions on which it rests, and also to set aside some objections. The fact itself must depend upon the anatomical conditions of the ocular system of vessels, and upon the physical peculiarities of the ocular textures. The choroidal vascular system contains in itself all the conditions of a regular circulation, and is imbedded in a peculiar stroma of elastic tissue, which closely surrounds the vessels. Upon the function of this stroma nothing has been hitherto made known. It appears that one of its objects may be to retain the vessels at a certain diameter.

The choroidal system and the other ocular membranes are subject to the continual influence of two forces, that act in opposite directions—on the one side the equable outward pressure of the ocular fluids, on the other the inward pressure of the sclerotic. Consequently the possibility of adding to the fluid contents of the eyeball must depend upon two circumstances—either upon the elasticity of the ocular fluids, or upon the yielding of the sclerotic. With regard to the fluid contents, it may be affirmed, *à priori*, that they offer complete resistance to the pressure occasioned by the foregoing experiments; and the water that forms 99 per cent. of their bulk possesses a degree of elasticity so small as to be inappreciable. Donders has shewn that the sclerotic is almost inextensible under any pressure to which it can be normally subjected; and the author's own experiments would shew that it is wholly inextensible. It will now be intelligible

how the regulation of the circulation of the eye is effected. *It is by the relation of interdependence between the tension of the ocular fluids (which, on its side, depends upon the endosmotic equilibrium between those fluids and the blood) and the tension of the sclerotic.*

On physiological grounds, indeed, the fact could not well be otherwise. The harmony of the opposition between the ocular fluids and the sclerotic is necessary, in order that the excessively delicate function of accommodation may be freely discharged. This function would soon and greatly suffer if the eye contained sometimes more blood, and sometimes less. Pathology teaches how considerable a disturbance of accommodation is produced when only the slightest derangement of the counter-working of the two forces exists. With the first appearance of glaucoma the eye loses its power of accommodation, the iris becomes immovable, the ciliary muscle paralysed, the eye presbyopic.

Proceeding to the phenomena that appear to contravene his position, the author mentions that, in eyes in which the intraocular pressure is increased, pulsation of the veins, or even of the arteries, occurs. Concerning the cause of this pulsation, all authors are nearly of one mind. The pulse depends upon the momentary increase of intraocular pressure during the arterial diastole, and upon its decrease during the systole. To this Donders adds that the pulse, which is very evident in tense eyes, exists in normal eyes also in a small degree. He discovered this by observing the fundus oculi under higher magnifying powers than had been used by Coccius and van Trigt, the discoverers of the venous pulse; and his statements have been fully confirmed. In fact, in every healthy eye, there are regular oscillations of tension, and these only become pathological when they pass a certain limit.

The experiments already detailed shew that interruption of the venous current is insufficient to produce any increased pressure, or any venous pulse. It has never been observed that, in any case in which only an increased pressure of blood was suspected, an increased pulsation corresponding to the hyperæmia has occurred: the pulse only comes into prominence when transudation preponderates over absorption within the eye. The question thence arises whether, in previously balanced conditions of diffusion, the interruption of the venous current in the neck would not increase the rapidity of the exosmotic blood stream. An absolute answer to this question cannot be given; but in a series of experiments tried by the author, it was not found that ligature of the jugular veins at all increased the rapidity with which salts injected into the veins appeared in the aqueous humour. It is well known as a pathological fact that impediments to the venous current promote watery transudation. That such transudation did not occur in the experiments may be explained as follows:— First, it is very doubtful whether the rapidity of the watery dif-

fusion would be increased in so short a time as that for which the ligatures were tied. Experience teaches that the secretion of aqueous humour, *e.g.*, after paracentesis, does not take place so rapidly. Some hours are usually required before the eye returns to its normal tension. Secondly, supposing that the fluids in the eye increased during the momentary arrest of the venous current, yet this increase would be extremely small, and would first influence the vessels; that is, it would force back a corresponding quantity of blood into them. The blood would either be delivered in smaller quantity by the arteries, or it would be forced into the veins, very yielding channels, although for the moment closed. From all this it follows that the diameter of the vessels is diminished, by the increased exit of fluids from the eye, in the same degree that it is increased by the venous stasis; so that the intraocular pressure remains the same, after deligation of the veins, as it was before. Hence the pulse is not so much the proper expression of the oscillations of intraocular tension, as of the above mentioned mechanical faculty of blood regulation in the eye; by which, in the same degree that the pressure is increased by the arterial diastole, it is diminished by the simultaneously increased outflow through the veins. The intraocular pressure in the normal eye thus remains always the same, and the faculty of blood regulation governs not only the hæmostatics, but also the intraocular tension.

A second objection seems to rest upon the phenomenon observed by Ludwig and K. Weber in the following experiment. When the manometer tube was introduced through the cornea into the eye of an animal, the mercury in the tube was thrown into oscillations by each stroke of the heart and each respiratory movement. The observers inferred from this that the vessels of the normal eye expanded at the moment of expiration, and contracted at inspiration, as at the stroke of the heart. The experiment was entirely vitiated by the perforation of the cornea, which destroyed the natural harmony between the ocular fluids and membranes. If in the normal eye there were to-and-fro movements of the membranes on the surfaces of which images are received, no distinct vision would be possible. The fact that the quantity of blood within the eye remains always the same allows the visual function to be carried on without hindrance from the circulation; and any wound of the coats of the eyeball that diminishes the support afforded to the ocular blood-vessels, is followed by their distension, even to such a degree that they may burst, and produce retinal hæmorrhage. In a dog that died during experiment, I observed that, on suspending it head downwards for some minutes, there was no enlargement of the retinal veins. On suspending it by the ears it was manifest that the blood obeyed the action of gravity, and flowed away from the eyes. The cornea was punctured, and the experiment

repeated; and then, on hanging the dog head downwards, the ocular vessels become considerably distended, both in the retina and on the disc. In this experiment all vital influence was set aside, and the result absolutely proved the mechanical regulation of the ocular circulation.

It has been often observed by medical jurists, in persons killed by hanging, that Schlemm's canal was distended with blood. This is easily to be explained, since Schlemm's canal lies in the thickness of the sclerotic, and the blood within it is subject to a totally different pressure from that within the eye. Jurists have never observed distension of the veins of the iris, although they open directly into Schlemm's canal.

In conclusion, it is suggested that the measurement, by a manometer, of the different pressure in the ligatured and the normal veins, may afford a means of estimating, very nearly, the normal pressure within the eye.

OPHTHALMIA AFTER INJURY; CONSECUTIVE CATARACT; CONFLICTING MEDICO-LEGAL OPINIONS.

By Dr. Ragaine (*Journal de Brux*, xxxviii, p. 27, Janv., 1864; *Dr. Geissler, in Schmidt's Jahrbücher*, Bd. 127, p. 211).

A SERVANT girl, 19 years old, professed to have received a blow on the right eye from the head of a man who had embraced her. She stated that she was menstruating profusely at the time, that the menses ceased, that inflammation and acute pain commenced in the eye, and increased in three days so much as to be insupportable, being attended by photobia and lacrymation. She kept the eye bound up, and in the second week, on account of increasing pain, withdrew herself from household work. In the third week she applied for the first time to a surgeon, who ordered ten leeches to the temple, seidlitz water, and a blister to the nape of the neck. No improvement followed, and the left eye became irritated. In the tenth week after the injury the patient came to hospital. In the right eye the lids were slightly swollen and reddened, there was much intolerance of light and lacrymation, acute injection of the palpebral and ocular conjunctiva, and also of the anterior ciliary vessels, which were brought into view when the conjunctival vessels were emptied by digital pressure. There was an ashy grey opacity of the cornea, especially in the centre, where it had the appearance of glass dimmed by the breath. The pupil was much contracted. In the left eye there were also symptoms of kerato-iritis, although the cornea was less turbid, and the pupil not so narrow. Vision could not be tested on account of the photophobia. The general condition was normal,

and the repressed menses had reappeared. Pulse 80, appetite and sleep indifferent. In hospital the case was treated by repeated local antiphlogistics (instillations of atropine, mustard footbaths, inunctions of mercurial ointment with belladonna). Internally, mercurials and antimonials, with occasional laxatives and opiates. Lastly, blisters were applied to the nape of the neck. In a day or two the pain was relieved, and the pupil dilated. In 45 days the inflammation of both eyes had quite disappeared, but in the right only there remained a small corneal opacity. The patient was then discharged, but it was specially dwelt upon, by the witnesses opposed to the belief that the ophthalmia was of traumatic origin, that the eye then still required the greatest care for a month or two, on account of possible sequelæ.

In 26 days after the patient was discharged, $4\frac{1}{2}$ months after the injury, the opacity of the right cornea had entirely disappeared. 14 days later the patient perceived a whitish mist or cloud before the right eye, which increased so quickly that in three weeks she could only distinguish light from darkness. After dilatation of the pupil, opacity of the anterior layers of the lens was discovered. On the nasal side a portion still remained transparent.

In medical opinions it was suggested that the cataract, being one-sided, and no fresh morbid influence having been in action, could only be referred to the injury; and it was assumed, from the slow progress of the opacity, that the capsule had not been ruptured. Moreover, on account of the slight corneal turbidity, the commencing changes in the lens might easily have been overlooked when the patient was discharged.

The surgeon who had first attended the case, three weeks after the blow, was questioned by the court. He denied that the inflammation had been produced by the blow, on the ground that no mark of the latter was visible on the cheek, neither was there any injection of the conjunctiva or episclera. He found only a facetted ulcer in the middle of the lower half of the cornea, with no swelling of its margins. The posterior layers of the cornea were somewhat turbid, the iris had a reddish aspect, and there was a small quantity of pus in the anterior chamber. This witness believed that the inflammation, as he saw it, had existed for only four or five days at the outside; but he could not assign (excluding the blow) any other reason for its occurrence. The hospital surgeon opposed (Dr. Geissler thinks rightly) the opinion of his predecessor. The absence of direct marks of a blow on the cheek, three weeks after its infliction, proved nothing, since such marks in healthy people would seldom last so long. The belief that the inflammation of the cornea was idiopathic was not supported by experience; and ulcers and turbidity of the posterior corneal layers with hypopyon, must be taken as results of an irritation of more than four or five days' continuance.

Dr. Ragaine does not state the decision at which the court arrived. In the few forensic cases of eye injury on record, the foregoing is not without interest; but the influence of the arrest of the menses was probably considerable.

TEST LINES FOR THE DETERMINATION OF ASTIGMATISM.

By Dr. John Green, of Boston, U. S. (Zevende Jaarlijksch verslag omtrent de verpleging en het onderwijs in het Nederlandsch Gasthuis voor Ooglijders.)

[(Note by Prof. Donders.) Dr. John Green attended for some time the practice of the Netherlands Hospital for Eye Disease, and found opportunity to prepare these test lines, and to have them lithographed.]

These test lines are given in three plates, and are intended to facilitate the recognition of astigmatism.

In use they are to be placed at a distance of from ten to twenty Paris feet. At this distance the accommodation of an emmetropic or a myopic eye is relaxed, and the pupil rendered much larger than in accommodation for a short distance. With a large pupil the refraction is determined over a large part of the cornea.

The test lines in Plate I. are formed from a set of three equal lines, precisely like those already given by Snellen with his test types, as No. XX. The thickness of each line, and of the interval between each two lines, appears, at a distance of twenty feet, under a visual angle of one minute. The set of three lines appears under an angle of five minutes. Twelve sets of these three-fold lines are placed as radii passing through the centre of a circle, about a foot in diameter, and at an angle of thirty degrees from one another. Each set of lines is numbered, from I. to XII., in the same way as the dial of a clock. The whole star of lines may be drawn upon cardboard, and made to turn upon a central pin, so that it will be easy to make any set coincide exactly with the meridian of clearest vision.

In the application of this arrangement to the recognition of astigmatism, it is only necessary to ask the patient whether, at from ten to twenty feet distance, he sees one set of lines better than another. For this purpose it is sometimes necessary to correct an evident ametropia by spherical glasses; and it is perhaps best to select glasses that produce a slight degree of myopia. In case, then, the patient, at the greatest distance for clear vision, sees the sets of lines with different degrees of distinctness, the existence of astigmatism is shown, and the direction of the meridian of greatest refraction is at the same time declared.

In order now to determine the *degree* of astigmatism, it is desirable to exchange the star-shaped figure for a single set of three lines (Plate II), since otherwise the patient would have difficulty in keeping his attention fixed in the same direction. This single set must be placed in the direction of clearest vision, and the refraction determined by common spherical glasses. The card must then be turned on its axis, so as to give the lines a direction at right angles to the first, and the refraction tested again. The strongest positive glasses, through which the lines in the last position are clearly seen, express the degree of hypermetropia; the weakest negative glasses that are chosen convey the degree of myopia. The difference of refraction in the two directions, at right angles to one another, is the difference in the two chief meridians; that is, the degree of astigmatism. This determination can then be tested by the star-figure, which should be looked at by the patient through that cylindrical lens that corresponds to the degree of astigmatism discovered. This testing is not without importance, especially in hypermetropes, since they often find it difficult, especially in looking at single lines, completely to relax their accommodation. This difficulty is, however, diminished, since it is usual, before the testing, to paralyse the accommodation by the instillation of atropine.

Plate III contains another star-shaped figure, formed of sixty single lines, separated from each other by equal angles. The centre of this figure should be fixed from a distance by each eye separately. The figure must remain stationary, and will serve for the recognition of irregular astigmatism, since some of the lines will often be less distinct than others. It will often be evident that the different regions, corresponding to the different sectors of the lens, present a marked difference or irregularity of refraction.

Utrecht, February, 1866.

UPON THE NERVE OF ACCOMMODATION.

By Dr. D. von Trautvetter, of Kiew (*A. f. O.*, xii, 1, 95). Abstract.

The author states that the nerve of accommodation has been hitherto unknown; and sets forth the results of his experiments with a view to its discovery. He first devotes some pages to a *résumé* of the opinions of authors upon the question, and points out that the results of anatomical investigation have been negative. His own experimental researches were at first no more successful; but at last he was able to obtain positive evidence.

It is well known that, in accommodation for the near point, the eye undergoes several changes, such as contraction of the pupil, projection forwards of the pupillary margin of the iris, retraction

of the equatorial margin, and a shifting and diminution of the Sanson's image reflected from the anterior surface of the lens. The most important of these changes is the increased curvature, or projection forwards, of the anterior surface of the lens, which the change in the Sanson's image renders visible. The author used this phenomenon as the test of accommodation, and in order to determine the nerve that governs the function. He says expressly "the nerve," since his experiments shew that only a single nerve is concerned. He observed the Sanson's image reflected from the anterior surface, and irritated by turns all the nerve trunks proceeding to the eyeball. The trunk that, when irritated, produced movement and diminution of the image reflected from the anterior lens surface, the author considers to be the nerve of accommodation.

After giving very full details about the arrangement of the lights in order to get good images, about the methods of securing the animals operated upon, about the steps of the various operations, about the position of the observer, and the various precautions necessary, the author states the following results:—

1. In mammalia (dogs, cats, and rabbits), no change was produced in Sanson's images by irritation of the third nerve, of the sympathetic, or of the fifth.

2. In birds (pigeons and hens) irritation of the third nerve, and of this only, produced a marked change in the position and size of the images; leading to the conclusion that, in birds, the third is the nerve of accommodation.

3. The negative results obtained from dogs, cats, and rabbits, may be explained by supposing that, in these animals, the accommodation is either deficient, or performed in a different manner from that of men and birds. In rabbits the power is probably wanting—a view supported by the absence of muscle in the ciliary zone, which consists of connecting tissue only. In dogs and cats, the existence of the power may be inferred from the presence of a ciliary muscle; but the facts:—*a*, that the relative sizes of the reflected images are different in them from their relative sizes in men and birds; *b*, that they possess only radiating, and no circular fibres in the ciliary muscle; *c*, that in dogs the pupil dilates for near and contracts for distant vision, support the belief that in these animals the function differs in its arrangements from those of men and birds.

The paper concludes by an account of some further experiments after iridectomy, intended to show, and showing, that the ciliary muscle is the active agent in the accommodative change. In one of these experiments the cornea and iris were removed, and then electric excitation of the third nerve was followed by projection forwards of the uncovered lens. The author states positively, that the third nerve is the nerve of accommodation, and the ciliary muscle the muscle of accommodation.

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Part I.

Original Contributions.

CASES OF NEURITIS OPTICA, NEURO-RETINITIS AND RETINITIS.

By J. W. Hulke.

The very instructive papers on these affections contributed by Mr. Hutchinson and Dr. J. H. Jackson, to recent numbers of this journal, have led me to collect and analyse my notes of cases of inflammation of the optic nerve and retina which have come under my own care or observation, chiefly at the Royal London Ophthalmic Hospital and Middlesex Hospital. The hindrances to systematic note-taking, inseparable from a large out-patient practice (arising out of the great number of persons to be treated in a limited time, and from their irregular attendance), have made these records in many respects incomplete; yet I venture to hope that they are not a wholly useless contribution to our acquaintance with a class of affections which (as Dr. Jackson has well shown) are scarcely less interesting to the general physician than they are to the ophthal-

mic student, on account of the opportunity they afford us of seeing in the living eye, with great precision, the results of morbid processes identical with those which pursue their course unseen in the larger nerve-centres hidden from direct view; and for the valuable corroborative evidence they give us of the existence of various dyscrases, *e.g.*, uræmia, syphilis, tuberculosis, diphtheria.

The number of these cases (39), does not at all represent the frequency of neuritis optica, neuro-retinitis, and retinitis, because many cases were not recorded; and I have excluded all in which the ophthalmoscopic signs, although rendering an inflammatory origin very probable, were not by themselves sufficient to put this beyond doubt; as also all cases associated with albuminuria, having already published several of these in an earlier number. This series comprehends such cases only as came under my notice during the exudative period, or where the existing signs pointed unmistakably back to a past inflammatory stage.

I have found it convenient to classify the cases in the following four provisional groups, which comprise :—

I. Cases where the neuritis, &c., resulted directly from an external injury.

II. Cases where the neuritis, &c., was consecutive to an intracranial disorder.

III. Cases of neuritis, &c., accompanying a dyscrasia, whether due to the entrance into the body from without of a specific materies morbi, *e.g.*, syphilis and diphtheria, or to the generation of morbid conditions in the body, such as constitute uræmia, chlorosis, rheumatism, spanæmia.

IV. Miscellaneous cases not referable to any of the foregoing groups.

As long as the idea that light-shyness, and pain are necessary symptoms of retinitis, continues to be entertained, we cannot too frequently insist that these are not essential phenomena, but they signify the participation by other structures in the inflammatory process; for in confir-

mation of the opinion expressed long since by Mackenzie (at a time when the existent methods of investigation did not allow him to give a positive proof of it), we now know by actual inspection of the living eye, that retinitis and neuritis may and often do run their course without any photophobia, outward redness, and pain, and without the iritic exudations described by Sir W. Lawrence. In fine, inflammation of the optic nerve and retina are not necessarily attended by any outward manifestations of disease, except a dilated and sluggish or motionless pupil, when atrophy of the nervous tissues has resulted.

Instead of hyperæsthesia retinæ, there is blunted sensitiveness; the bright illumination of the retina with the ophthalmoscopic mirror is borne without distress; patients tell us that they see things indistinctly, as if through a mist, and this when the ocular media are so transparent that we can accurately discern the nerve and retina. Where the visual acuity returns, it is reasonably presumable that its diminution did not depend on grave structural alterations in the bacillary and conal elements (since we have no anatomical observations supporting the idea that these, when destroyed, can be regenerated); but that it was (as it is always mainly) caused by the arrest of the incident light in the hazy inner strata of the retina, and by molecular disturbances in their elementary nerve-tissues, disordering their functions. In other words the lessened sensibility of the retina is due to opacity of the inner layers, whereby the incident light is barred out from the rods and cones; to disorder or suspension of the influences, whatever these may be, which the inner granules and the nerve-cells of the ganglionic stratum exert on the molecular changes transmitted through them from the rods and cones; and to diminished or lost conductiveness of the internuncial nervous fibres.

The essential ophthalmoscopic sign of inflammation of the optic nerve and retina is opaque swelling, accompanied with vascular turgescence. And the differential

diagnosis of the several forms of neuritis, &c., is to be found in differences in the amount and colour of the opacity; in the degree and kind of the swelling, and the extent of the vascular turgor; in the predominance of some of these phenomena, and the super-addition of what may be termed accidental phenomena (*e.g.*, extravasations of blood, and sundry appearances, marking retrogressive metamorphoses of these and various inflammatory products); and lastly, in the way in which these marks are combined and grouped.

I. *Group.* I have seen very few cases where neuritis or retinitis could be fairly considered the immediate consequence of a direct injury, and I have notes of two such only. In one of these the neuro-retinitis was only part of an extensive ophthalmia; in both, the stress of the inflammation fell in the nerve, and the retina was only slightly involved, and in neither were there any hæmorrhages.

Case I.—*Neuritis after a Blow.*

A tall blonde, æt. 20, struck her left brow sharply against a desk. At the moment she was not much hurt, but aching pain above the left eye soon followed, and, in consequence of some visual defect in this eye, she found herself obliged to turn her head towards the left when she wished to see things in this direction. At the end of a week the defect had so much increased that she could not discern her hand, but two weeks later, when she came to the Royal London Ophthalmic Hospital, she could count my fingers at a few inches distance directly in front of the eye. The optic nerve and a narrow ring of the surrounding retina were swollen and opaque, so that the arteries were wholly hidden, and the veins appeared to end at the surface of the disc, while in the transparent part of the retina they were observed to be turgid and tortuous.

She was a lucifer-packer, but told me that neither she nor any of the other factory girls had ever suffered in health from this work. Three years before she had attended the London Hospital for glandular swellings in the neck and sore throat. I

did not find any scars in the fauces or other evidence of syphilis, which she denied ever to have had.

Case II.—*Neuro-Retinitis and Sub-Retinal Exudation after a Blow.*

An artisan, æt. 22, was struck by a large splinter of iron on the temporal side of the left eye-ball, which it bruised but did not pierce. This was followed by redness and myodesopia; the former soon passed off, and the latter was replaced by a general dimness of this eye. Eighteen months afterwards he came under my care at the Royal London Ophthalmic Hospital. The anterior and posterior conjunctival veins were swollen; the optic nerve was red and opaque, and from its upper and temporal margins radiated two silvery opaque bands of retina slightly separated from the choroid. The vitreous humour near these was cloudy.

II. *Group.*—In most of the cases belonging here, the signs were restricted to the optic nerve, or only slightly overstepped its margin into the retina. The distinctive characters of Neuritis descendens (opaque, greyish-white swelling of the papilla, hiding the lamina cribrosa, and more or less concealing the vasa centralia, extending into the surrounding retina, and masking the margin of the disc; a form aptly called by Mr. Hutchinson the *woolly* nerve); as also those of the "Stauuing's papilla" (considerable, steep swelling of the papilla, with but slight opacity and much venous turgor), were not so frequently observed as mixed forms.

The cases have been very few (three only), where, after making an ophthalmoscopic diagnosis of neuritis during the patient's life, I have had an opportunity of learning, by *post-mortem* examination, the exact nature and seat of the intra-cranial disease. In one of these, where the ophthalmoscopic signs were those of neuritis desc, I found a sarcoma growing from the basis cranii, and implicating the cavernous sinus, unaccompanied by any appearance of meningitis, or inflammation of other structures inside the

skull. In a second case, a "Stauuing's papilla" was associated with a large gummy tumour, in the middle fossa of the skull and orbit; and in the third, recorded below, a "Stauuing's papilla," accompanied a post-ocular neuritis, meningitis, and node of the base of skull. These cases have taught me to be very cautious in forming an opinion of the nature of the disease inside the skull, from the ophthalmoscopic signs. Some of the patients, particularly the younger ones, had head symptoms pointing to meningitis; but in many the cranial mischief was too obscurely shadowed by its symptoms for me to hazard a conjecture respecting its nature. In one case neuritis followed sunstroke, in another it occurred in a healthy man, after watching an eclipse.

Case III.—*Sunstroke, Strabismus, and Neuritis Optica.*

A woman, æt. 24, in good health, while standing in her garden with her head uncovered, exposed to the sun in July, suddenly felt violent pain through her temples. She sat down upon a chair, and in a few minutes fell off this on the ground; her left side was powerless. She said that she was never unconscious, but this is not quite certain, since it appeared from those who ran to her assistance that she was convulsed, and foamed. This was shortly followed by convergent squint, diplopia, and obscuration.

When I first saw her, at King's College Hospital, to which I was then Assistant-Surgeon, fourteen days after the seizure, both pupils were widely dilated, and motionless, and not the slightest perception of light remained. The only morbid appearances I could then discover were slight over-fulness of the retinal veins, and slight haziness of the optic nerves. Six months later both nerves exhibited the characteristic marks of advanced white atrophy.

Case IV.—*Diplopia, great Pain above the Right Eye and in the Head, and Neuritis, after Watching a Solar Eclipse.*

A basket-maker, æt. 38, a few days after watching a solar eclipse in July, 1860, saw things double. After six weeks the diplopia disappeared, but during the whole of the following Sep-

tember he had great pain above the right eye and in the crown of the head. This was succeeded by total extinction of sight, which lasted fourteen days, when quantitative perception of light returned; and November 6th, when he first came to the Royal London Ophthalmic Hospital, he could distinguish between a blank and a printed page, and imperfectly recognize large objects, as a finger or a pen. His visual field was a small trefoil or three-lobed figure, and the point of greatest distinctness was excentric.

The optic nerve was hyperæmic and hazy, the retinal veins were swollen and tortuous, and the vitreous humour was cloudy. In December the nerve was pale and the vasa centralia were small. In June 1861 the nerve was white, its surface was slightly depressed, and the arteria was then very greatly diminished.

Case V.—*Epileptic Fits (?) after a severe fright, followed by Neuritis Optica.*

A woman, æt. 22, while apparently in good health, was frightened by a cow; next week she had a fit which was followed by others. These occurred at first about once a month, and afterwards with increasing frequency until they happened almost daily. Subsequently the intervals again became much longer. Her sight also quickly failed, and nine months after the fright its sharpness was so reduced that she was obliged to be led to the hospital. She said that her right arm felt numb, although its tactile sensibility was not observed to be lowered, and she mentioned that before the fright she had sometimes had cramps in the legs.

The image of each optic nerve was confused, its colour greyish white, its surface slightly depressed, and its contour ragged. The vasa centralia, particularly the arteria, were diminished, and the neighbouring choroid was slightly atrophied.

Case VI.—*Meningitis, Neuritis Optica Descendens.*

A delicate blonde, æt. 19, was brought to the Royal London Ophthalmic Hospital November 23, 1864, with very defective sight. With her right eye she could only distinguish letters in No. 20 J.; and with the left read short words in No. 4 J.

Both optic nerves were very swollen, and greyish-white. They were good examples of what Mr. Hutchinson aptly calls the woolly nerve. The opacity ran for a short distance into the surrounding retina, hiding the contour of the nerve, and ceasing with a tolerably distinct edge. The vasa centralia seemed to end taperingly at the centre of the disc upon its inner surface, and they were frequently lost to view in the opaque tissue. The remainder of the retina was transparent, and its veins were very swollen.

Although very thin, her mother said she had been very stout as a school girl. Her catamenia appeared at fourteen, and after six or seven times they ceased, and never recurred. Her health did not at first seem to suffer, but in her eighteenth year she began to have frequent and severe pain in the head, chiefly in the crown, and her memory was noticed to be less good than before. About the same time also she began to retch, and this, at first, once every three weeks or month. Six months after the beginning of these symptoms, her sight, previously good, began to fail, and at this time, for several weeks, her left eye squinted outwards.

I transferred her to the Middlesex Hospital, where she remained during several months under Dr. Stewart's care, her symptoms being headache, retching, pain in the lower part of the belly, and delirium. This latter was never violent. She always replied pertinently when spoken to, but when left alone she lay apparently hardly conscious of what was passing in the ward, muttering bitter reproaches against herself for wicked actions which it was quite impossible she could ever have done. After some months the delirium ceased, and she slowly regained flesh and strength, so that she could walk alone, and she left the hospital 31st July, 1865. The optic nerves were still swollen, very white, but less opaque. Both eyes retained a slight quantitative perception of light.

Case VII.—*Neuritis Optica Descendens.*

A stout, florid, maid servant, æt. 23, was brought to me at the Royal London Ophthalmic Hospital March 7th, 1866. She could then only spell short words in No. 16 (Jaeger's types). Her sight had began to fail at Christmas, and about that time she also

began to suffer from frequent headaches. These still continued; the pain was severe, but not localized. She walked with a peculiar shuffle, which was less noticeable when she went quickly, and which appeared to proceed from a want of co-ordinating power, rather than from any deficiency of muscular force. She had not menstruated for several months.

Both optic nerves were swollen, and of an opaque grey colour. The right nerve was also encircled by a belt of cloudy retina (twice as broad as the diameter of the disc), streaked with radiating red brushes of extravasated blood, and dull grey splashes. Within this opaque area the arteria centralis and the choroid were completely obscured, and the retinal veins, turgid and tortuous, were lost to view wherever they dipped from the inner retinal surface. In the left eye the opaque retinal belt around the nerve was narrower, the retinal veins were less swollen, and there were not any hæmorrhages.

As I could not take her into the Royal London Ophthalmic Hospital, I passed her into the Middlesex Hospital, where she remained under Dr. Stewart's care until the following August. During this time I frequently examined her, and found that, while the ophthalmoscopic signs scarcely altered, her sight steadily diminished. The headaches gradually subsided, and the shuffle also disappeared.

I next saw her January 13th, 1867. The optic nerves were then pure white, their outlines were blurred, and the vasa centralia were very small, the artery particularly. V = o, or perhaps slight central qt. p. l.

Case VIII.—*Meningitis? Double Neuritis Optica.*

A stout, hale-looking woman, æt. 36, was brought to the hospital 21st October, 1859, perfectly blind. She told us that in 1854, after miscarrying, she had had a severe illness, with great headache and delirium. The doctor called it brain fever; he bled her twice, cupped her between the shoulders, put leeches several times on her temples, and had her head twice shaved. During this illness she lost her sight. Once before the miscarriage she had seen "a black cloud, that broke up into a shower of stars and blacks." She had not menstruated for three years.

The pupils were large and motionless. Both optic nerves were dull-white; the vasa centralia were small, and the arteries extremely so; the veins were very tortuous.

Case IX.—*Meningitis? Double Neuritis Optica.*

A tippling leather-dresser was suddenly seized with pain darting from the occiput to the forehead. It was so severe that he kept his bed, and was leeched and blistered by his doctor. During this time his sight grew dim, and three weeks after the beginning of the attack, on coming to the Royal London Ophthalmic Hospital, he only read No. 16 J. with the right eye, and No. 19 J. with the left.

The pupils were large and sluggish. Both optic nerves were hyperæmic and opaque, and encircled by a belt of hazy retina, outside which the veins were seen much distended. In the right nerve there was also a minute apoplexy.

Case X.—*Hemiplegia of the Right Side—Neuritis Optica in the Right Eye, at first limited to half of the disc.*

A hard-drinking painter, 66 years old, had hemiplegia of the right side, with defective speech, in 1853. He recovered, and in 1859 had another attack on the right side, which was also found to be hyperæsthetic, but his speech was not affected. His limbs slowly regained strength, but the hyperæsthesia was succeeded by numbness, which still existed in September, 1860, when I saw him, six months before which his right eye became suddenly uneasy, as if dust were in it, and this was followed by a little pain behind the eyeball and dimness.

With spectacles corresponding to his presbyopia, he read short words in No. 14 J. with this eye, but the visual field was small, and limited above by a wavy horizontal line, one inch above the central fixing point and the punctum cæcum.

The lower half of the optic nerve disc was swollen, and of a dull, opaque, grey colour. The opacity hid the corresponding part of the contour of the disc, and extended a short distance into the retina. The upper half of the disc was less hazy, but its contour was also confused. In the disc the artery was scarcely

discernible, and the image of the veins was broken and faint. In the upper hemisphere of the retina the veins were only slightly over-full, while in the lower half they were very turgid and varicose. Three months later the whole nerve disc was more swollen, the entire retina was hazy, and the veins in its upper and lower halves were equally swollen. These appearances continued without any appreciable change until January, 1861, when he passed from under my care. I heard that he died soon after of apoplexy.

Case XI.—*Neuritis Optica in the Right Eye, followed by Hemiplegia.*

A corpulent man, æt. 61, broken-spirited by a great reverse of fortune, and harrassed by bronchitis, came to the Royal London Ophthalmic Hospital 4th March, 1865. The sight of his right eye had been failing some time, and he could then only indistinctly recognize large, bright objects in the upper border of its visual field; the retina corresponding to the rest of the field retained only quantitative perception of light.

The optic nerve was hyperæmic, and so hazy that the vasa centralia appeared to end at its surface. The retina around the nerve was also hazy, while beyond this belt the veins were swollen, and unusually conspicuous. Above the nerve there was a circumscribed sub-retinal serous effusion.

He had headache and tinnitus, and severe pain behind the eyeballs. He could not lie on the left side of his head because this made him feel, he said, "half dead." I heard that he soon became hemiplegic, and died.

Case XII.—*Cerebro-Spinal Disease—Double Neuritis Optica.*

A tall, thin man, æt. 56, was led to the Royal London Ophthalmic Hospital 13th May, 1862. His right eye retained only a feeble quantitative perception of light. The optic nerve and the retina around it for a space equal to its radius were of an opaque grey, the opacity diminishing peripherally. In the nerve disc the arteries were invisible, and the veins could only be seen in those parts of their course which were close to the surface.

He was scarcely able to walk, less from want of strength than from imperfect concert in the muscular movements. He com-

plained of distressing giddiness, and he was very restless and extremely irritable, but his memory and other mental faculties were not impaired. He said that four years previously after severe brow-ache he had become paraplegic, from which he partially recovered, and that shortly before coming to the hospital he had accidentally discovered the blindness of his left eye by chancing to close the right. I heard afterwards that his left eye became blind, and that he had unmistakeable signs of brain disease.

CASE XIII.—*Headache, Neuralgia in the Right Temple and Cheek, Neuritis Optica in the Right Eye.*

A woman, 35 years old, after suffering during three months from attacks of severe pain in the top of the head, attended with palpitation, was seized in one of these with dimness of the right eye, accompanied with neuralgia in the right temple and cheek, and drowsiness. Five days after the accession of the dimness, when I first saw her at the Middlesex Hospital, 31st October, 1865, perception of light was extinct in this eye; its pupil was dilated and motionless. The optic nerve was swollen and cloudy, and at its centre there was a minute apoplexy. The retinal veins were very turgid. Leeches were put to the right temple, and she took Pot. Iod. gr. v 3 d. November 3.—The headache was less, and the drowsiness gone. 7th—Since the last visit she felt a commotion in the back of the head, with giddiness, and a copious watery flow from the nose. 10th—Less pain in the head, but a fresh retinal apoplexy. 21st—During the last three days she has bright sparks in this eye, which now has quantitative perception of light. 28th—The nerve is less opaque and the apoplexies are gone. She discerns my fingers held a few inches off in the temporal side of the field. December 22nd—The nerve is now white, the lamina cribrosa is too distinct, and the vasa centralia are very small.

CASE XIV.—"*Stauuing's Papilla*," *post ocular, Orbital and Intracranial Neuritis Optica—Meningitis and Node at the Base of the Skull—Softening of Anterior Lobe of Left Cerebral Hemisphere.*

Very considerable and steep swelling of the intra-ocular end of the nerve, with but slight opacity, led me to infer the existence

of a tumour in the skull. Neuralgia of the 5th cranial nerve pointed to the neighbourhood of the Gasserian ganglion as its probable seat, and the occurrence of a chancre four years before, and latterly of pains in the bones, made it not unlikely that this tumour was a syphilitic node.

The post-mortem examination showed that the diagnosis, as far as it went, was correct, but it also revealed post ocular optic neuritis both inside the skull and in the orbit, in connection with which it should be noticed that the ophthalmoscopic picture was that of a "Stauuing's papilla," and not that of neuritis optica descendens. Perhaps had the patient lived a little longer we should have seen the congestive swelling replaced by that considered typical of neuritis descendens.

A tall, thin, pale-faced lithographic printer, æt. 30, came to the Royal London Ophthalmic Hospital 16th January, 1867, complaining that he saw very imperfectly with his left eye, and I found that he could not read smaller type than No. 8 J. with it, and of this type short words only.

Its optic nerve was swollen; the swelling was considerable and very steep, as shown by the strong arching of the vasa centralia from the point where they first became visible at the inner surface of the disc to the margin of the latter, where they abruptly changed their direction in passing from the nerve to the retina. Although so swollen, the nerve-tissue was but slightly cloudy, so that the normal distinctness of the image of the vessels was only slightly damped. In the retina the veins were turgid and kinked, but no abnormal appearances were observed in the arteries.

The visual field was centripetally contracted. Measured at 8 inches distance it was a small polygon of $7\frac{1}{2}$ inches vertical, and $5\frac{1}{2}$ inches horizontal diameter, with the fixing point 2 inches from the bottom, and equi-distant from the outer and inner sides.

Excepting a chancre four years ago, since which he had had occasionally pain (which he thought rheumatic) in the bones, he said that he had never had any illness until the present, which began three months before he came to me with neuralgia in his left cheek. For this a decayed molar in the upper jaw was pulled out, which gave him a few days' ease, but the pain returned and grew worse in spite of the extraction of the remaining upper molars and the left lateral incisor tooth.

These particulars of his illness were elicited with difficulty, for he was very reticent and irritable. Suspecting an intra-cranial tumour, in order to watch him more closely than I could do at Moorfields, I transferred him next day to the Middlesex Hospital.

The neuralgia was always relieved by hypodermic injections of morphia, but he grew more irritable and after a few days took entirely to his bed. On February 5th the retinal veins were rather less swollen, and a slight increase of visual acuity was noted. On February 8th, although in but little pain, he was very excitable, the least noise in the ward startled him. He read No. 6 J.

10th.—At 9 o'clock, A.M., I found him confused; he answered my questions irrelevantly, and was too weak to sit up in bed, p. 72. In the night he had had three epileptic fits. Next night he had three similar fits, which were followed by a longer and deeper stupor; indeed at 12½ o'clock P.M. he was scarcely conscious; p. 80, and intermittent. His brother, who had been sent for, now told us that he had had several fits before he came to the Royal London Ophthalmic Hospital. Throughout the night of the 11th he had a quick succession of fits between which he remained in a stupor, scarcely taking notice when spoken to, but sometimes moving his limbs, particularly his arms, in a regular manner. His left was more convulsed than his right side, the arm most; the legs were stiffly straightened out, his lips foamed, and the contents of the bladder were expelled. Next morning the intervals between the fits were shortened to a few minutes, he was stertorous, and comatose, he retched occasionally, and he died the same night, 12th February.

At the examination of his body, made next day, we found the dura mater to adhere so tightly to the lower, outer, anterior and upper surfaces of the anterior lobe of the left cerebral hemisphere, that it came away from the bones and remained attached to the brain when this was lifted out of the skull. This lobe was very soft, almost diffluent, it fell to pieces notwithstanding great care in removing it, and the whole brain was less firm than normal.

The left optic nerve, from the foramen opticum backwards to the chiasma, was greyish, and about 2½ times as thick as the corresponding part of the right nerve. The swelling diminished from the foramen to the chiasma, the left side of which it only

slightly implicated. It was caused by the presence of immense numbers of small round and roundly oval cells packed between the bands of nerve-fibres. Much of this new cell-growth was more or less advanced in fatty degeneration. The right optic tract contrasted remarkably with the left, being softer, only half as broad, and much flatter. The sella turcica, and the hollow of the cavernous sinus were occupied by a thick, semi-translucent, firm mass which involved the pituitary body, and also covered the upper surface of the left petrosal bone, implicating the Gasserian ganglion and the three primary divisions of the fifth cranial nerve. This gummy mass chiefly consisted of small round cells (of the granulation cell type), one source of which appeared to be the connective tissue corpuscles of the dura mater, since these were found actively proliferating. The pituitary body was very hyperæmic, but not otherwise structurally altered. The orbital segment of the left optic nerve did not exhibit any roughly-appreciable morbid appearance in its posterior $\frac{3}{4}$, but at 4‴ from the eyeball it began to enlarge and increased from here to the sclerotic canal. This swelling was found to depend on alterations in the nerve-trunk and in its sheath. An exudation, which in chromic acid preparations appeared in the form of a granular coagulum, with webs of fine fibres resembling those of coagulating fibrine, and numerous cells ranging from $\frac{1}{2}$ and up to 3 or 4 times the diameter of a red blood-disc, filled the meshes of the loose areolated tissue which occupies the interval between the inner and the outer sheaths. Similar morbid products were observed in the nerve-trunk. The septa were much thickened by masses of cells identical in appearance with those in the sheath, but there was less granular exudation. The blood-vessels were dilated. Both in the sheath and in the nerve-trunk the origin of the morbid cell-growth was distinctly traceable to proliferation of the connective tissue or its modification, the neuroglia.

The optic papilla, examined after hardening in a chromic acid solution, was found very much swollen. Its free surface projected unnaturally towards the vitreous humour, and its deep surface depressed the lamina cribrosa and made it unnaturally concave. The texture of the nerve was open, its tissues were separated, and their interstices were occupied by masses of exudation and of cells resembling those found in the intra-cranial segment of the nerve, and like them also referable to proliferation of the neu-

roglia. The venous system of the retina was dilated, but the other retinal tissues did not exhibit any noteworthy changes. The choroid immediately around the optic papilla was thickened with exudation.

The most interesting points in this case appear to me to be :—

The great progress of the inflammatory disease inside the skull before any very prominent cerebral symptoms manifested themselves.

The association of a "Stauuing's papilla" (usually regarded as pathognomonic of intra-cranial tumour) with an inflammatory affection of the membranes at the base of the skull, and with an indubitable coarse neuritis optica behind the eyeball, within the orbit and in the cranium.

The predominance of the neuritis in certain segments of the nerve, as shown by the great enlargement of the nerve from the foramen opticum to the chiasma, by its relative integrity between the foramen opticum and the spot where the arteria centralis enters it, and its swelling from this spot to the eyeball.

The fatty disintegration of the inflammatory products, and the absence of anything like histroid arrangement, proving their transitory character, and showing their affinity with the adventitious formations which compose the syphilitic gummata. Their derivation from the connective tissues, and the resistance of the nerve fibres, which explains the conductiveness of the apparently so greatly altered nerve-trunk.

The wasting of the right optic tract; another pathological proof of the decussation of the fibres in the chiasma.

III. *Group.*—Neuritis, &c., in connection with a dyscrasia.

In the five following cases in this group, distinct syphilitic symptoms of an early kind (rashes, or ulcerated throat) were present. The inflammation in four was restricted to the nerve. The fifth is remarkable for the

occurrence of frontal herpes, which was not, however, attended with any aggravation in the train of ocular symptoms. The opacity and swelling of the optic nerve were not so great as in neuritis descendens, and the opacity was greyer. In none were there any apoplexies.

CASE XV.—*Neuritis Optica.—Syphilitic Palmar Psoriasis, Ulcerated Throat and Tongue.*

November, 1865, a blonde, æt. 27, was transferred to my care by a colleague, at the Middlesex Hospital, who had treated her for a chest affection. The sight of her right eye had been slowly failing since spring, and when I saw her she could only spell short words in No. 20 J. with it.

The optic nerve was hyperæmic and opaque, and the vitreous humour near it was also hazy, and filled with fine gauzy opacities. The other eye was healthy.

I found she had palmar psoriasis, and an ulcerated throat and tongue; and she told me that she had had good health until November, 1864, when, shortly after rejoining her husband (a soldier, who had been four years absent from her on service), the rash, and other symptoms of syphilis, appeared.

CASE XVI.—*Neuritis Optica.—Syphilitic Psoriasis and Fissured Mouth.*

A man, æt. 37, the sight of whose right eye had been failing for 16 months, came to the Royal London Ophthalmic Hospital, 29th April, 1862. He could then only spell slowly words in No. 20 J.

The optic nerve was hyperæmic, swollen, and so opaque that the vasa centralia were only visible close to the inner surface of the nerve.

A slight synechia posterior told of a former iritis. He had psoriasis and a fissured mouth, and acknowledged to have had a chancre some months before.

CASE XVII.—*Neuro-retinitis and Herpes Frontalis three years after Iritis associated with a Scaly Syphilitic Rash.*

A clerk, æt. 35, who had been under my care three years before, for iritis, and a scaly syphilitic rash, returned to the

Royal London Ophthalmic Hospital, April 19, 1866, with great dimness of this eye. No. 6 J. was the smallest type he could spell with it.

Small dots of brown pigment upon the anterior capsule of the lens, and a limited synechia posterior spoke of the past iritis. The temporal half of the optic nerve-disc was red, hyperæmic, while the nasal half had a dull, stone-grey colour. There was a similar opaque blotch in the retina, just below the disc, which completely hid the branches of the vasa centralia that traversed it. A fine diffused haze, pervaded by delicate gauzy membranes, obscured the neighbouring part of the vitreous humour.

A few days later he had a scorching pain in the right brow which was followed next day by herpes, taking the course of the supra-orbital branches of the fifth nerve. It subsided, leaving scars and numbness; and no nutritional disturbance of the cornea or conjunctiva accompanied or followed the eruption.

The hyperæmia and exudation in the optic nerve and retina were slowly replaced by atrophy.

Case XVIII.—*Neuritis Optica, a year after a Syphilitic Rash and Sore Throat.*

A woman, æt. 49, came to the Royal London Ophthalmic Hospital, 20th April, 1864, with considerably diminished visual acuity of both eyes, that of o. d. = $\frac{16}{30}$ S. of o. s. = $\frac{2}{3}$ S. Both optic nerves were hyperæmic, and slightly swollen. She dated the failure of her sight from the spring of 1863, when, having previously been in good health, she had a rash and a sore throat. I learned from the doctor who had attended her, that he had regarded these as syphilitic, and that her husband had shortly before had a chancre. Thousands of glittering motes rising before her eyes towards night were the first symptoms.

I saw her at long intervals, and a year later the left optic nerve had an opaque, greyish, flocculent appearance, in which the vasa centralia were completely hidden, while beyond the nerve, in the transparent retina, the veins, owing to their turgescence, were very conspicuous. The right optic nerve was hyperæmic, but not opaque. O. d. read No. 12 J., and o. s. spelled the same type.

CASE XIX.—*Neuritis Optica after a Chancre, Indurated Bubo, and Ulcerated Throat.*

A traveller, æt. 46, who had had chancre, indurated bubo, and ulcerated throat; and who drank eight pints of beer daily, and smoked two ounces of strong tobacco per week, finding his right eye defective, came several months afterwards, as the defect increased, to the Royal London Ophthalmic Hospital, November 18, 1865. With an effort he could then read No. 2 J. with each eye. The right optic nerve was pale, and the vasa centralia were rather small. The left optic nerve was hyperæmic, slightly swollen, and opaque, the image of the vasa centralia being confused; and in the transparent retina the veins were seen to be rather turgid. In December this nerve was less hazy and white, and No. 19 J. was the smallest type read with this eye.

The two following cases possibly throw some light on the paralyses which are not infrequently observed during the convalescence of patients from diphtheria. That of the palate might be fairly attributed to the direct extension of the inflammatory action from the faucial mucous membrane to the muscles, and perhaps in some instances this actually happens, but where the paralysis first makes its appearance some weeks after the attack, and when the patient is convalescent, this explanation does not hold. It is obviously inapplicable to distant paralyses, *e.g.*, of the external muscles of the eyeball and of the ciliary muscle, which more often come under the notice of the ophthalmic surgeon, and also to those of the limbs of which I had two examples not long since at the Royal London Ophthalmic Hospital. In such cases we can only suppose that the materies morbi, which produces the diphtheritic throat, also induces some morbid state of the nerves of the paralysed muscles, since we have no evidence that the muscular tissue is itself, in the first instance, affected; but what may be the nature of the affection of the nerves we have no direct means of ascertaining, nor do we certainly know what part of the nervous circuit is affected primarily, or

principally, the trunks or the peripheral plexuses. My colleague, Dr. Greenhow, informs me that in some cases of paralysis of the limbs, after diphtheria, the nerve-trunks have been found tender when pressed, which might signify an inflammatory condition of the nerve. Now this I have actually seen in the optic nerve. In the first case, which came under my notice in March of this year (1867), the interval between the diphtheritic attack and the first eye symptoms was so great that I hesitated to connect the neuritis with the diphtheria, but in the second case the interval was so short as to afford a very strong presumption of their causal connection.

Case XX.—*Atrophy of the Optic Nerve from Inflammation after Diphtheria.*

A tall, slender girl, æt. 18, came to the Royal London Ophthalmic Hospital March 20th, 1867, with very considerable impairment of the sight of the left eye. She could not recognize any smaller letters than No. XL (Snellen) with it, and this not beyond six inches, fixing excentrically with the nasal side of the retina.

She told us that nine months previously, one day whilst at needlework, both her eyes felt dazzled, and for a few moments she could not see with either; then the sight of the right returned, but for a few minutes longer she could not see any objects with the left. Whether quantitative perception of light was lost is uncertain. After a little while the sight of this eye slightly improved, but she had never after been able to read with it.

About two years before this she had had diphtheria—not severely, for she did not entirely keep her bed. She was ill three weeks, and her brother, who had it at the same time, died of it.

The left optic nerve had a dull-white colour. Its edge was slightly ragged and blurred. The vasa centralia were small, especially the artery. The lamina cribrosa was unnaturally distinct, and this up to the edge of the nerve-disc, but its details were not quite so sharply defined as they usually are in atropia simplex.

The right eye was healthy, and its visual acuity $= \frac{1}{1}$.

Case XXI.—*Neuritis Optica during Convalescence from Diphtheria.*

A tall, thin, feeble, pallid girl, æt. 14, was brought by her mother to the Royal London Ophthalmic Hospital May 25th, 1867. With her left eye she could only read No. 14 (Jaeger), while with the right she read No. 1.

The optic nerves, particularly the right, were hyperæmic, and slightly hazy; and the retinal veins were very turgid and varicose.

Five weeks previously she had had a severe attack of diphtheria. Two weeks before she came to me she found that she could not thread a needle; and that from that time the visual obscuration had steadily increased.

I saw her only once again, July 10th, when the optic nerve was less opaque, but her V. remained as before.

In the five following cases anæmia from rapid child bearing, too long suckling, and leucorrhœa, was the only apparent cause of the neuritis. The glistening white spots and the hæmorrhages, so commonly met with in anæmic retinitis, were absent, and the urine in each case was found free from albumen.

Case XXII.—*Neuro-retinitis—Great Weakness from Rapid Child-bearing, and too long Suckling.*

A woman, æt. 35, after suffering during several months from photopsiæ and occasional dimness of the left eye, accidentally discovered that its sight-sharpness was permanently lessened. She could still read large type with it, but a fortnight later, December 6, 1868, when she came to the hospital, she could not recognize the largest letters. The photopsiæ continued, and she felt a pricking pain in the eye.

The optic nerve was swollen, red, and hazy. The opacity extended into the retina for a short distance from the nerve, and produced a slight confusion of the image of the arteria centralis. Near the nerve the vitreous humour was also slightly turbid, and there were some small brown flocs in it here.

She was feeble, having had seven children in quick succession, and having suckled the youngest child during two years

until a week before she came to me. Her urine was tested for albumen, but none was found. Four months afterwards the optic nerve was no longer swollen, its redness was less, but it was still slightly hazy, and it was now encircled by a narrow ring of incompletely atrophied choroid.

Case XXIII.—*Neuro-retinitis—Profuse Leucorrhœa.*

A tall blonde, æt. 36, came under my care at the Royal London Ophthalmic Hospital February 22nd, 1865. Her sight had been failing during six months, and the right eye had then only quantitative perception of light, while with the left eye she could still make out No. 16 J., slowly and with an effort.

The right optic nerve was hyperæmic, and it, and also a belt of neighbouring retina as broad as its radius, were hazy, the vasa centralia being hidden in this region wherever they left the surface, while in the transparent portion of the retina the veins were conspicuous by their turgescence. Similar, but less strongly marked, morbid appearances were seen in the left eye.

Her health was delicate. She had had a very profuse leucorrhœa during nine months, and her strength had latterly failed. She had three healthy children, and said that her sight had been weak in each pregnancy. No albumen was found in the urine, the sp. gr. of which was 1015°.

Case XXIV.—*Neuritis Optica—Uterine Disorder.*

A saddle-stitcher, æt. 29, who worked from early morn until late at night, became alarmed by flashes and occasional obscurations of the left eye, accompanied with brow-ache, and a feeling of distension of the eyeballs. The obscuration soon lost its intermittent character and became permanent, the sight-sharpness decreasing rather quickly until on August 7th, 1860, when she first came under my care at the Royal London Ophthalmic Hospital, she could not spell No. 20 J. The optic nerve was very red, and its tissue was slightly cloudy, which rather confused its outlines. The retinal veins were very swollen and tortuous.

Her health was very delicate. She had a weak chest, dysmenorrhœa, leucorrhœa, and occasional hæmaturia, with dif-

ficult micturition, which made me suspect a stone in the bladder, but I could not detect one. Her urine was tested several times, and on each occasion was free from albumen. Leeches were put on the temple, and she took small doses of corrosive sublimate. Under this treatment her sight slightly improved, and September 4th, 1860, she read No. 16 J. I next saw her April 11th, 1861, at which time the optic was still slightly hyperæmic, but its tissue was no longer hazy. No further improvement of vision was noted.

Case XXV.—*Neuritis—Anæmia.*

A tall, pale girl, æt. 14, who had consulted me in March, 1863, for hebetudo and hypermetropia (Hm = $\frac{1}{20}$), was again brought to the Royal London Ophthalmic Hospital November 5th, 1864, this time with very considerable diminution of visual acuity. She read only short words in No. 16 J., and this slowly.

The optic nerves were hyperæmic. I thought them slightly swollen, and the larger retinal vessels were over-distended. She was slightly intolerant of light, knitting her brows, and complained of lassitude and headache. She continued under my observation until November, 1865, during which time there was little alteration in the ophthalmoscopic signs, but a gradual decrease of visual acuity. Her health improved slightly after the appearance of the catamenia, in the spring of 1865.

Case XXVI.—*Neuro-retinitis—Chlorosis.*

A short, very chlorotic umbrella-stitcher, æt. 26, came to the hospital July 9th, 1864, on account of failing sight. At that time V. o.d. = $\frac{1}{17}$, o.s. = $\frac{1}{13}$ (Snellen).

The optic nerves were swollen, and their tissue was so hazy that the larger branches of the vasa centralia appeared to end at the surface of the disc. This haziness ran beyond the nerves for a short space into the retina, and beyond this three large white bands in the right eye, and a single one in the left, radiated for a distance rather more than the diameter of the disc in the retina. From their fine striation and brush-like edges, these were judged to be dark nerve-fibres.

She took gr. $\frac{1}{16}$ of corrosive sublimate in dec. cinch. ter die,

and under this treatment the haziness of the nerve and of the retina slowly disappeared, and the white patches of nerve-fibres became plainer. Ten months after her first visit V. o.d. No. 14 J., o.s. No. 2 J. All inflammatory opacity had disappeared; the contour of each nerve was slightly ragged; and two white spots, fringed with an excess of pigment, were noticed in the choroid at some distance from the left nerve.

Case XXVII.—*Neuritis Optica—Anæmia.*

A stout, but not healthy, over-worked housemaid, æt. 22, became conscious of a slight defect in her sight, and by closing her eyes alternately she found that objects seen with her right eye were overhung with a faint haze. A week later she came to the Royal London Ophthalmic Hospital, November 14, 1865, when we found that she could read No. 2 J. correctly after looking intently at it for a few moments, and even No. 1 J. but slowly and blunderingly. The optic nerve was tumid, its tissue opaque, its contour confused. Within it the outlines of the large vessels were very indistinct, and the smaller branches of the artery and veins were invisible, while beyond it, in the transparent retina, the venous network was conspicuous by its turgescence. The vitreous humour was pervaded by fine gauzy webs.

Case XXVIII.—*Neuritis—Pulmonary Phthisis.*

A brunette, æt. 50, whose sight had been slowly failing for some years, came to the Royal London Ophthalmic Hospital February 17th, 1864. At that time she could not read any smaller type than No. 14 J. I regret that I have not any note of the ophthalmoscopic appearances. She was a thin delicate woman, and she had been several times a patient at the Victoria Park Hospital for disease of the chest. Her pulse intermitted, the heart's impulse was very forcible, and its second sound was accentuated.

When I again saw her, May 17th, 1865, a further diminution of her visual acuity was noted; she could then only read No. 18 J. at six inches distance. The optic nerves were too red, slightly swollen, and their outlines were slightly confused. The retinal vessels were turgid.

October 18th—She could only read No. 19 J., the right nerve was, however, more transparent, but the left was slightly hazy. November 14th—The hyperæmia and the haziness were less. V. No. 16 J.

The three patients whose cases next follow had had rheumatic fever, but a long interval (of 7, 5, and 4 years) occurred between this and the neuritis. One complained of shortness of breath, but in none was any valvular disease of the heart discovered with the stethoscope. None, at the time I saw them, had any other manifestations of a rheumatic diathesis, and the connection of the neuritis with this remains doubtful.

CASE XXIX.—*Atrophia Nervi Opt. ex. Infl.—Sequelæ of Circumscribed Choroiditis. Rheumatic Fever.*

A coffee-house keeper, æt. 33, a stout brunette, came to the Royal London Ophthalmic Hospital December 12th, 1863, on account of very imperfect sight with the right eye. She could not read smaller type than No. 12 J., and with the left eye no smaller than No. 8.

With the exception of an attack of rheumatic fever five years before (she was pregnant at the time, and the child was still-born), she had had good health. No cardiac or renal disease was discovered, nor could any history of syphilis be elicited.

The right optic nerve was pale, its contour was ragged, and at a short distance from its upper and temporal side there were several small white spots produced by atrophy and disappearance of the choroidal pigment, and a single larger, black, hyperplastic pigment spot. The venous system in the retina of the left eye was very turgid.

CASE XXX.—*Neuro-retinitis—Rheumatic Fever.*

A man, æt. 44, was startled by a defect in his right eye, which increased and took the form of a large central scotoma, which he compared in size and shape to a frying-pan. Fourteen days after this, when he came to the Royal London Ophthalmic Hospital, he could see the ends of the short lines of test-types,

but not the beginnings, and read words in No. 18 J. with this eye; the other eye was not affected. The right optic nerve and the retina around it were of an opaque grey colour, the opacity fading peripherally. In the opaque area the artery was quite hidden, and the veins were very indistinct, while in the transparent part of the retina the turgescence of these latter vessels made them very conspicuous. Two red brushes of extravasated blood radiated from the upper and nasal side of the nerve.

This patient had had rheumatic fever seven years before, during which his heart was said to have been affected, but no lesion was discovered when he came under my observation.

Case XXXI.—*Congestion of the Optic Nerves and Retina—Rheumatic Fever.*

A hop porter, æt. 41, whose sight had been slightly defective for about a year, came to the Royal London Ophthalmic Hospital October 10th, 1863; his V. at that time was $= \frac{13}{18}$ Snellen. The optic nerves were slightly hyperæmic.

He had had rheumatic fever four years before, which had left him, he said, short-winded, but no cardiac lesion was discovered by us. His work was very laborious, obliging him to mount three stories in a lofty warehouse several times a day. He was pale, and complained of great lassitude.

I saw him again in June, 1864. His visual acuity was less, with the right eye he could not read smaller type than No. 12 J., and with the left eye no smaller type than No. 14 J. Both optic nerves were then decidedly hyperæmic, and the retinal veins were over-full and varicose.

IV. Group of cases not referrible to the preceding groups.

Case XXXII.—*Neuritis Optica—Masturbation and Sexual Excesses.*

A stout, very pale man, æt. 31, who had masturbated excessively, then had married, and indulged immoderately in sexual intercourse, found his health and sight fail. He put himself under the care of one of my colleagues at the Middlesex Hospital, by whose courtesy I had an opportunity of examining his eyes. With the right eye he could still count my fingers at a

few inches distance, but the right had only quantitative perception of light.

Both optic nerves and a belt of the surrounding retina, as broad as their radius were swollen; they had an opaque greyish-white colour. In this region the arteria centralis could scarcely be distinguished, and the veins were only slightly less indistinct, while in the clear retina beyond they were very turgid.

CASE XXXIII.—*Neuro-retinitis—Numerous Apoplexies in the Nerve and Retina.*

A healthy-looking woman, æt. 44, having gone to bed seeing well, awoke in the morning with dimness of the left eye. A week later she saw purple spots on some white clothes, and came in great fright to the Middlesex Hospital, 11th March, 1863. At this time she discerned, with an effort, letters in No. 18 J. with this eye, and the other eye was not affected.

The left optic nerve was of an opaque red-grey colour, and stippled with minute crimson dots of extravasated blood. Within the disc the arteries were not visible, and the veins appeared to end taperingly at the surface. In the retina, between the nerve and the equator, there were several large dull-grey blotches, in which the veins were often hidden; and here too there were many small red capillary apoplexies, and some grey dots, which were thought to be retrograding apoplexies. The vitreous humour was cloudy.

I could not find any renal or cardiac disease. She had ceased to menstruate five years before.

Leeches were put to the temple, and she took corrosive sublimate.

A week later the vitreous humour was less cloudy. The red hæmorrhagic dots were fewer, and the dull-grey dots were more numerous.

April 11th.—The contour of the optic nerve was distinct; the larger branches of the vasa centralia could be traced beneath the surface of the disc to the lamina cribrosa, and the finer twigs were also plainly discernible. Her sight was, however, rather less clear. She continued to take corrosive sublimate, and the exudation gradually disappeared, and her sight improved so that

she read, 6th May, No. 16; although at this time fresh apoplexies were seen in the retina and in the choroid, below and at the temporal side of the optic nerve. In July a slight blur of the contour of the nerve was the only remaining morbid appearance, and with a + glass, answering to her presbyopia, she read No. 14 J.

Case XXXIV.—*Neuro-retinitis—Hæmorrhages and White Dots in the Retina—No Albumen in Urine.*

A general dealer, æt. 59, came to the Royal London Ophthalmic Hospital 27th March, 1867, having a fortnight before found his right eye defective. He could just recognize letters in No. xxx S. with it. The optic nerve and the retina immediately around it were slightly swollen and hazy. The opaque region was dappled with red apoplexies and white dots and blotches. The vena centralis was turgid.

No albumen was found in his urine. He denied having ever had syphilis. He smoked half an ounce of tobacco daily, and drank but little beer.

Case XXXV.—*Neuro-retinitis.*

A tall, stout, ship's stewardess, æt. 56, whose sight had been imperfect during five or six years, came to the Royal London Ophthalmic Hospital for advice, 25th March, 1865. With spectacles which corrected her presbyopia she read No. 6 J. with her right eye, and No. 10 J. with the left. Both optic nerves were hyperæmic and hazy, and a hazy band stretched from the nasal side of the left into the retina. In May the nerves were less hyperæmic, but they had become swollen, and had a pale bluish-grey tint. The retinal veins were distended. She now only read No. 14 J. with the right eye, and No. 10 J. with the left.

Case XXXVI.—*Neuro-retinitis.*

A trimming-maker, æt. 21, came to the Royal London Ophthalmic Hospital, June 27th, 1866, for advice about "a film" over her left eye, which she had first noticed a fortnight before. She read No. $4\frac{1}{2}$ S. with this eye. The nasal half of its

optic nerve was too red, while the temporal half was swollen and opaque. Corresponding to this, the contour was confused, and an opaque greyish patch, equal to 1½ diameters of the disc, ran out from it on the retina. The entire length of this was traversed by a small vein, which had so sharp an image that it was manifest that the opacity was situated behind the inner strata of the retina, and was, therefore, in the outer strata of this coat, or between it and the choroid, or in the choroid. In the retina below the disc there was a small grey spot, with a central dot of extravasated blood.

Under a course of corrosive sublimate the hyperæmia and the opacity disappeared, and her sight improved.

Case XXXVII.—*Neuro-retinitis—Disease of the Aortic Valves.*

A pale, wasted woman, æt. 53, came to the Royal London Ophthalmic Hospital, 21st May, 1864, complaining of a gradual failure of sight, of several months' duration, interrupted by intercurrent accessions of greater dimness. These, she said, had been very frequent during the last eight or ten weeks, and, she added, "sometimes, two or three times in a quarter of an hour, I go quite blind for a couple of minutes; my sight goes gradually, but comes back quicker." With each eye she read No. 18 J. Both optic nerves and the immediately surrounding retina had an opaque reddish-grey colour, which hid the contour of the nerves, and caused apparent breaks in the vasa centralia. In the left eye the vena centralis was especially turgid.

Always delicate, in childhood she had had inflammation of the knee-joint, ending in anchylosis. Fifteen months before I saw her she began to suffer from a thumping noise in the head, chiefly in the occiput and right temple, and she not unfrequently fainted.

She had a loud systolic bellows sound—loudest at the base of the heart and along the aorta, towards the right sterno-clavicular joint. No albumen was found in her urine.

Case XXXVIII.—*Neuro-retinitis and Circumscribed Choroiditis.*

A schoolmistress, æt. 24, was alarmed by the appearance of a large round blur directly in front of the left eye, shortly after

which this eye felt tired and strained, even by slight use. She came to the Royal London Ophthalmic Hospital January 28th, 1859. I found the lower half of the visual field of this eye mutilated. The visual acuity, diminished throughout, was greatest just above the centre of the field, and only here she could read type about equal to No. 16 J. The optic nerve and the retina around it were swollen, and so opaque that the vessels were completely hidden in the nerve and for some distance beyond its margin. One-sixteenth of a grain of corrosive sublimate was ordered to be taken three times a day. Under this treatment the swelling and opacity slowly disappeared, and on April 8th a slight blurring of the upper and nasal part of the contour of the nerve, and an atrophic white spot with hyperplasia of the choroidal pigment around it near this part of the nerve, were the only remaining traces of the past inflammation. The lower part of the visual field remained mutilated, but in the upper half her visual acuity had much improved. She now read "diamond" type.

CASE XXXIX.—*Neuro-retinitis—Hæmorrhages on the Retina and Choroid.*

A tall, thin woman, æt. 29, who had, on and off, during several years, been under medical treatment, noticed a sudden dimness of the left eye. Next day, when she came to the Middlesex Hospital, she could not read smaller print than No. 16 J. with this eye; its optic nerve and retina were slightly hazy; and the retinal veins were very swollen. There were numerous small spots of extravasated blood in the choroid, and a few larger patches in the retina.

She was evidently in very weak health, and had been confined of her second child only six weeks before. Her urine did not contain any albumen or sugar, but its sp. gr. was rather high, 1027°. She often fainted. The heart's sounds were normal.

The haziness and the hæmorrhages disappeared; and the congestion gave place to anæmia and atrophy of the optic nerve.

ON SOME OF THE ANOMALOUS EFFECTS OF ATROPINE ON THE EYE.

By George Lawson, F.R.C.S.,

Assistant-Surgeon to the Royal London Ophthalmic Hospital, Moorfields; and the Middlesex Hospital.

Atropine is chiefly used in ophthalmic practice to procure dilatation of the pupil, and to act as a sedative in various forms of inflammation of the eye. The preparation which is generally prescribed is the sulphate of atropia, this salt being preferred to the alkaloid, on account of its greater solubility, for whereas the sulphate is readily dissolved in distilled water, atropia is soluble in water in the proportion only of 1 in 500 parts.*

In an ordinarily healthy eye, where the retina possesses its normal sensibility, and the iris acts freely, I have never known atropine fail to dilate the pupil; but as a sedative to the eye, I have, on a few occasions, seen it not only fail, but act as a direct irritant, and in two cases which I have to relate it caused the most acute and troublesome symptoms.

In speaking of the anomalous symptoms produced by atropine, I would state my belief that they are entirely exceptional, and that whilst it is well to be aware that they may possibly arise, yet I do not think they ought to prejudice the surgeon against the use of a drug which, when fitly prescribed, is, in the large majority of cases, most beneficial. That a solution of the sulphate of atropia will occasionally produce irritation has been noticed by several ophthalmic surgeons, and the reason of its acting in this irregular manner has been attributed to the presence of some free acid in the solution. The salt has

* Squire's Companion to the Pharmacopœia.

not been neutral, and the solution has given a slightly acid reaction to litmus paper, and to this has been attributed its irritating effects.

I think myself that the explanation is wrong, and that the free acid theory has but little, if anything, to do with the fact that a solution of atropine will occasionally give rise to very painful and troublesome symptoms. What amount of free acid can there be in the one or two drops which are dropped into the eye from a solution of the sulphate of the strength of gr. j. ad aquæ ℥j. ? and yet when thus diluted I have seen it occasion great irritation. We use daily in ophthalmic practice salts which contain much more free acid than the sulphate of atropia, such as the sulphates of zinc and alumina, but I do not remember any instance in which they have caused the peculiar forms of irritation which, in exceptional cases, I have seen spring from atropine. I believe that when atropine acts thus as an irritant, or produces peculiar and distressing symptoms, it is due to some idiosyncrasy on the part of the patient, which renders him intolerant of the alkaloid or of its salts, and, in some cases, of any preparation whatever of belladonna. In one or two patients in whom even a very weak solution of atropine has given pain to the eye, I have found that a solution of the extract of belladonna has been borne without even a feeling of annoyance, whilst in other cases the use of belladonna in any form whatever has seemed to act almost as an irritant poison.

The anomalous symptoms which atropine may produce are—

1st. A sense of smarting and heat in the eye, accompanied by redness and lachrymation. These symptoms may pass off in a few minutes, or they may extend over some hours, or even continue for many days.

2nd. An erysipelatous condition of the eyelids and surrounding integuments, with redness and chemosis of the conjunctiva.

As an illustration of the first class of symptoms I

will cite the following case:—For a patient on whom I had ten days previously operated for cataract, I ordered a solution of atropiæ sulph., gr. j. ad aquæ ʒj., to be dropped into the eye twice daily. The drops caused so much pain and redness of the eye that she was obliged to discontinue their use. On another occasion the same patient called at my house to have the eye which had not been operated on examined with the ophthalmoscope. Thinking that the irritation which had previously followed the use of the atropine might have been only an accidental occurrence, and due really to other causes, I dropped again into the eye some of the atropine drops. A little smarting was the immediate result, but the pupil became dilated, and I was able to examine the eye. By the time, however, she had reached home, the pain had much increased, and the eye shortly became acutely inflamed, and continued so for some days. This patient, I afterwards found, was able to use a solution of gr. v. of the extract of belladonna to the ounce of water without the slightest annoyance.

I have frequently seen atropine produce a momentary sense of pain at the time of its being dropped into the eye, accompanied with a flushing up of the conjunctival vessels, but, as a rule, these symptoms have lasted but a short time.

The next case is an example of the second group of symptoms which may be caused by atropine. At the beginning of this year I operated on a gentleman for cataract. The case at first progressed very well; but as there was a little soft lenticular matter in the pupil, I ordered a solution of sulphate of atropia (gr. j. ad aquæ ʒj.), to be dropped into the eye twice a day. Soon after its application the eye became very painful, with the lids swollen, and on the following day there was a distinct erysipelatous blush over the lids, and extending down the face. As I had never seen erysipelas follow the extraction of an opaque lens, or the use of atropine to the eye, I

regarded its occurrence as an accidental circumstance; but as the drops gave pain, they were stopped, and a lotion of the extract of belladonna was substituted. The erysipelas, however, increased, spreading over the head and forehead, and down the face. The belladonna lotion was shortly afterwards discontinued, as with the swelling of the lids it was not only useless, but it seemed to give pain. All the severe symptoms now abated, and the patient soon recovered, but with the pupil closed by opaque capsule. About six months afterwards the gentleman called on me at my house, as I wished to examine the eye previous to performing a needle operation. In order to ascertain how much the pupil would dilate, I dropped into the eye two drops of a solution of atropiæ sulph., gr. ii, ad aquæ ℥j. I had not at that time connected the erysipelas with the use of the belladonna, and was quite unprepared for the symptoms which were to follow. Very shortly after I had put the atropine into his eye, he complained of pain, which steadily increased; and about four hours afterwards the lids began to swell, and a distinct erysipelatous blush showed itself. By the following morning he was unable to open the lids on account of their swollen state, and there was a diffuse form of erysipelas extending from the lids to over the brow and face. As there was now no further application of any form of belladonna, the symptoms, having reached a certain height, gradually subsided, and the patient in about a week recovered. In this patient the relationship between the cause and effect was so manifest that there could be no doubt that the erysipelas was solely due to the atropine. Not only was he unable to bear the use of atropia, but a solution of the extract of belladonna evidently kept up the irritation in his first attack of erysipelas.

SYMPATHETIC OPHTHALMIA CAUSED BY A PROPAGATION OF THE IRRITATION EXCITED BY IMPROPERLY WEARING AN ARTIFICIAL EYE ON A PARTIALLY SHRUNKEN GLOBE.

By Geo. Lawson, F.R.C.S.,

Assistant Surgeon to the Royal London Ophthalmic Hospital and the Middlesex Hospital.

The following case is an example of the danger which is incurred by wearing an artificial eye on a shrunken globe, unfitted to support it. In this patient the sound eye suffered from sympathetic ophthalmia, caused by the irritation induced by wearing an artificial eye over a partially shrunken globe on which there still remained some of the true corneal tissue. The right eye had been completely lost for five and a half years, during which time it had given no annoyance, yet three weeks after wearing an artificial eye the stump became inflamed and painful. For nearly three months the man suffered from recurrences of this inflammation, until at last the sound eye sympathized, and rapid impairment of sight followed. Fortunately such cases are not very frequent, but still when they do occur they serve as warnings which should not be lost sight of. It is now an established fact that when transparent or semi-transparent cornea exists on the stump of a lost eye, an artificial one cannot with safety be worn. The false eye becomes a source of danger which may, as in the case I have to relate, be productive of irreparable damage to the sound eye. The true corneal tissue will not bear the friction against it which is engendered by an artificial eye, and when, as occasionally happens, a shrunken globe with true cornea still remaining on its surface, bears an artificial eye with impunity, the explanation is, that the artificial eye has been so constructed

that it does not press on the corneal surface, or exert any friction against it. The irritation which the false eye may excite may be confined to the shrunken globe, but on the other hand, there is always considerable danger that, as in the following case, the sound eye may become affected, and ultimately involved in that formidable disease so well known as sympathetic ophthalmia.

George B., æt. 29, came under my care at the Ophthalmic Hospital on June 18th, 1867. The history he gave of his case was as follows:—His right eye was lost from acute ophthalmitis five and a half years previously, when a portion of the cornea suppurated, and all sight was destroyed. The eye then gradually collapsed about one-third, and became soft.

Three months and a half before applying to the hospital he had an artificial eye fitted on to the remains of the lost one, and he began to wear it daily. The sight of his left eye was then very good. After wearing the artificial eye for about three weeks, he was obliged to discontinue it, on account of the pain and inflammation it excited in the shrunken globe. Similar attacks of inflammation recurred frequently, but they were always relieved by laying aside for a time the false eye. During one of these recurrences, about a fortnight previous to his application at the hospital, the left eye became affected sympathetically. The sight soon became very dim, and being compelled to leave his work, he came up to the hospital with the hope of gaining relief.

State on Admission.—The lost eye was shrunk about one-third. The greater part of the cornea was occupied by cicatrix tissue, but there was still some true cornea remaining. The globe was very red and painful. Its tension much diminished — T 2.

The left eye was suffering from sympathetic ophthalmia. The eye was red and watering. The aqueous humour was serous, so that the iris had a greenish hue, and there were some adhesions between it and the capsule of the lens. There was also some lymph on the lens capsule within the pupillary space. The tension of the eye was increased to T 1. He could only read words of 20 Jaeger.

June 18th.—The man was admitted into the hospital, and I removed the shrunken globe. He recovered quickly from the

operation, and was, in a few days, made an out-patient. The left eye has since very decidedly improved. There have been two or three recurrences of the inflammation since he left the hospital, but the eye is gradually subsiding into a quiet state. When I saw the patient in November last, the cornea was bright and clear; the sclerotic had nearly regained its normal whiteness; he was quite free from pain: and there was some improvement in his sight. He could read 20 Jaeger easily.

DISEASE OF THE CORNEÆ IN A CASE OF EXTENSIVE CUTANEOUS ANÆSTHESIA (ELEPHANTIASIS GRÆCORUM ANÆSTHETICUM?)

By Dr. Chisholm (of Charleston, U.S.).

A. J. Rose, æt. 44, a carpenter by trade, of apparently good constitution, from healthy parents. His mother died in advanced age, from phthisis; his father from some acute disease, at 60 years of age. No case of phthisis has since occurred in his family. He married at 22 years of age, in 1844, and has had three children. The first was an unusually large child at birth, and continued to develop rapidly. At 16 years of age, when he entered the Confederate army, he weighed 235 lbs., with a manly appearance. The second, a healthy child at birth, died suddenly when three days old. The third was born after the commencement of his disease, and came into the world sickly. It lived 18 days, and an autopsy revealed disease of the heart.

When 26 years of age, in May, 1848, he strained himself in lifting a heavy piece of timber, and from that time and to that accident he attributes the commencement of his disease. Soon after receiving the injury, a gradual and painless contraction of the fingers and toes took place, accompanied by an equally gradual loss of sensation, which progressed to a permanent and more or less complete anæsthesia. No inflammatory symptoms existed with these contractions. In two months the toes and fingers were so drawn, that he was forced to give up temporarily his trade. The contracted toes did not materially interfere with locomotion, but the contracted fingers prevented him from using his tools, and made him utterly helpless. A slight improvement in his symptoms enabled him, four months from the accident, to resume his work. Relaxation of the members was never however complete. About this period a large blister formed spontaneously over the metacarpo-phalangeal joint of the left big toe. The bursting of the bleb, and the accidental removal of the detached cuticle, established an ulcer, which, after repeatedly healing and re-opening, has, for the past eight years, remained a permanent sore.

In 1851, three years from the commencement of the disease,

a dark spot, like a blood-blister or a bruised surface, made its appearance at the extremity of the left index finger, unaccompanied by pain or swelling. In time the tissue broke down into a small ulcer, through which the head of the necrosed phalangeal bone protruded, and was eventually exfoliated.

In 1853 the extremity of the fourth finger of the left hand took on the same action. The bone remained protruding for nearly six months, without pain or swelling, when it was removed by a surgeon. The end of each third phalangeal bone in turn protruded through a similar painless chronic ulcer, and was in time discharged, a healthy cicatrix rapidly forming in each instance. Unless these necrosed bones were cut out before nature had isolated them, the exfoliation would be accompanied by neither redness, pain, nor swelling. A profuse ichorous discharge was the only accompanying phenomenon. Progressively each finger and toe lost its third phalangeal bone, then its second, and in most instances the first. Only two of these bones now remain in the hand, all of the others having been thrown off. In the feet necrosis of the metatarsal bones is now going on. These exfoliations from the fingers he characterises as altogether different from whitlows, a disease from which he had severely suffered in early life. He could foretell, he states, the loss of a phalangeal bone by a sensation of looseness of the bone within its soft envelopes, and its approach to the surface before the bloody, blistered spot would appear, which was invariably a precursor of ulceration and exfoliation.

Four years ago, a red spot appeared upon the lower edge of the lower cornea, and gradually developed itself into a fleshy, vascular, thick mass, which slowly extended upwards, involving the entire thickness, and finally the entire extent of the cornea. This change in the parenchymatous corneal tissue slowly crept upwards over the pupil, and at the end of three years had involved the entire extent of cornea, so as to completely shut out light. In its origin and progress it had caused no pain. The conjunctiva was slightly congested, with an increase in the lachrymal secretion. One year ago a similar spot appeared upon the lower border of the right cornea at its junction with the sclerotic, and, like that in the left eye, has gradually progressed upwards, rendering in its progress the corneal tissue thick, vascular, and opaque.

His condition at present, May, 1867, 19 years from the commencement of the disease, is as follows :—His general health is good. He eats, digests, and sleeps well. His spirits were good, until the progressive disease of the eyes threatened to leave him in darkness. His height is 5 ft. 8 in., and weight 146 lbs. The skin of his face, body, and limbs, is apparently very healthy, perfectly soft, without thickening or discoloration. In warm weather he perspires excessively. Anæsthesia more or less complete, exists over all portions of the body, and has been a prominent symptom from the commencement of the disease. When struck with a sharp instrument, he experiences only a sensation of pressure, not of pain. The only portions of the body where he feels the prick as such, are over the upper portions of the spine, the back of the head, and the skin of the chest, from under the arm-pits to the waist.

The elimination of the various phalangeal bones was painless, and without inflammatory symptoms, unless nature was interfered with. The cutting away of the dead bone would be followed by a soreness and a swelling of the finger, and a pain in the arm-pit without swelling. He at times has a severe pain in the soles of the feet, which he likens to boring with a sharp awl, yet there is no sensation when struck. In washing his feet his wife usually tests the temperature of the water. Some years since, during her absence, he undertook to do his own testing, and was only aware that he had used boiling water to his feet, when he saw most of the skin of his extremities come away in the towel. In spite of this extreme anæsthesia, should he unexpectedly tread upon a pebble, a very severe pain darts up the limb, disappearing immediately upon the removal of the cause. His hands and arms are equally insensible to pain. On one occasion he thoughtlessly leaned against a hot cylinder, and baked his arm, painlessly. His attention was not called to the accident until the next day; an extensive cicatrix marks the seat of the injury.

Notwithstanding the loss of sensibility, his flesh heals very rapidly, when cut or bruised. In spite of the many ulcers which from time to time have given exit to necrosed bones, the skin is soft and healthy on his boneless fingers, which, with good nails appended, are drawn up towards the palm. The extremities of his feet are in an ulcerated condition, and discharging an offensive

ichor. With loss of sensibility there has been no loss of muscular force, or any indication of paralysis. His limbs are large, firm, and well developed. His mucous surfaces are not affected, sensation in them is natural. He controls urination and defecation, and complains of the usual colicy and griping pains of indigestible food or drastic medicines. His hearing is perfect, and taste good. His sense of smell has only become impaired within the past year, since which time large brown crusts have been discharged from the nares weekly. There is no excessive or offensive discharge from the nose, and he can still detect odours. His sight is nearly gone, the eyes presenting a curious appearance. The left cornea is replaced by a thick, fleshy, red disc, apparently of fibrous structure, with abrupt perpendicular margins at the sclerotico-corneal junction. At this circular line the diseased corneal tissue is suddenly elevated three-eighths of an inch, into a thick, flat disc, covered by a comparatively healthy and not much thickened conjunctiva. In this transparent mucous tissue, a few large vessels run to the slightly depressed centre of the disc, and then disappear in its substance. The ocular conjunctiva is only slightly injected, and otherwise healthy. The sclerotic and other tissues of this eye are apparently in a healthy state. Neither pain nor inflammatory symptom accompanied this corneal change. Since sight has been shut in, the eye has had a sore feeling, and exposure to strong light is uncomfortable. The lachrymal secretion is in excess.

In the right eye the process for the corneal change can be readily followed. The lower half of the cornea has already undergone the conversion into thick, opaque, pinkish, fibro-cellular tissue. The margin at the sclerotic-juncture, the portion first changed, is abruptly elevated one-fifth of an inch. This thickened portion is continuous for the extent of two lines. The opaque, fleshy, cornea is then gradually bevelled off towards the neighbourhood of the pupil, when it fades out into a cloudy cornea, which parenchymatous cloudiness precedes the conversion into thickened, fleshy, fibro-cellular, not very vascular tissue. The upper third of the cornea is perfectly transparent, and apparently healthy, the middle third is cloudy above, and opaque below; the lower third is thickened, opaque, and conspicuously and abruptly elevated. When the eye is directed downwards, the anterior chamber appears of normal dimensions, and not

encroached upon by the thickening cornea, the increase in which appears to be altogether external. The iris is healthy, as are all other tissues of the eye. The pupil acts freely, and under atropine, which allows the pupil to correspond with the upper clear third of the cornea, he sees well. There is a slight redness of the conjunctiva, and increased lachrymation.

The patient's habits have been always good. Has not had syphilis. Wife healthy. No miscarriages. Has never had cutaneous eruption, nor sore throat. Has been under treatment from the commencement of his disease, dating from the strain. Has been kept for months under the influence of mercury. Has taken pounds of iodide of potassium, and gallons of cod-liver oil, and ounces of Donovan's arsenical solution. Has exhausted the list of alteratives, yet the disease steadily progresses.

A CASE OF EPILEPTIFORM AMAUROSIS.

By J. Hughlings Jackson, M.D.,

Physician to the Hospital for the Epileptic and Paralysed, and Assistant Physician to the London Hospital.

Some time ago I spoke of cases of patients who had occasional temporary disturbances of vision, using the term Epilepsy of the Retinæ. I then thought the retina was the part of the nervous system in fault, but a further study of cases of brain disease makes me feel far less certain of this in any case. I now therefore use the term Epileptiform Amaurosis, but simply because it implies less. Were I sure that the retinæ were the seats of the temporary change, I should still use the expression Epilepsy of the Retinæ. For I think, to say the least, that as standing for a clinical entity Epilepsy is a term of doubtful value, and it would serve very well as a name for the occasional discharge of nerve force which deteriorated nerve tissue allows. I trust we shall ultimately be able to apply the term precisely to temporary states of various internal regions at fault, when there are certain temporary external symptoms. To show how I hope to use it, I will mention that I conceive unilateral convulsion to be Corpus Striatum Epilepsy, the analogue of the common form of Hemiplegia Corpus Striatum Paralysis. Again I consider Case XXIV, recorded in my last paper, to have been an Epilepsy of parts in the range of the anterior cerebral artery.

I wish to consider Epileptiform Amaurosis in comparison and contrast with temporary disorder of another important Special Sense, viz., with subjective sensations of smell. (See Cases XXI and XXIV.)

In most cases I have seen, when the patient has complained much of such sensations he has, besides the occasional losses of consciousness, complained also of great

mental failure. This is the more strange as my practice does not include cases of what are usually called mental disease. It is, however, an association of symptoms which theoretical considerations of the community of blood supply of the olfactory bulb, and a large quantity of the hemisphere would lead us to expect to occur. (See p. 281, "Lancet," June 16th, 1866, "Med. Times and Gazette," Feb. 29th, 1868.)

Next, I have remarked several times that in cases of convulsion beginning unilaterally, temporary failure of sight is sometimes a complication, and I have pointed out that this temporary association of symptoms has its permanent counterpart in amaurosis, from double optic neuritis, and hemiplegia. I have spoken of a possible explanation of the connexion of the two symptoms ("Med. Times and Gazette," April 30th, 1864, and these Reports, Vol. V., Pt. IV.) by a consideration of the arterial supply to the optic nerves, corpus striatum, and hemisphere; on the same principle, as I explain the association of occasional loss of consciousness with subjective sensations of smell. With Amaurosis and Unilateral convulsive seizures, there are usually no mental defects, beyond delirium in Cerebral Fever. The middle cerebral artery commands fewer convolutions than the anterior cerebral artery, which vessel supplies the great commissure, the corpus callosum, betwixt the cerebral hemispheres. When the convulsion is of the right side, however, there may be temporary defect of speech.

Having instanced Epilepsies in which smell and sight are involved, I will just mention that there are temporary seizures which have intelligent relations with deafness and subjective noises, presumably of nervous origin. In these cases there are interparoxysmal circulatory symptoms, "nervousness;" the seizure may be a "faintness," or a convulsion, and is sometimes attended with great sickness. In this instance, however, the hypothesis of arterial regions does not apply. The relations of the auditory to the vagus

nucleus account, I suppose, for such an association of symptoms.

My impression is, that by studying the permanent along with the temporary defects of the three important special senses in their most intelligent relations with other symptoms, we may be able to learn much of the real pattern of the nervous system.

In some cases the failure of sight is by coloured vision, and I have recorded cases of convulsion, beginning unilaterally in which there was this manner of failure. I now record a case in which the sight simply failed occasionally. In this case the failure of sight is not so easily explicable as it is when it occurs with unilateral convulsion. We cannot form any speculation as to the part of the optic nervous system which failed. The Epileptiform Amaurosis was probably a partial fit—an aura—just as spasm of the hand is a partial fit of convulsion, occasionally merging in a severe and general convulsion. Some patients who have convulsive seizures always lose their sight before the fit. The following case is interesting because the failure of sight occurred in the place, so to speak, of seizures which most would admit to be "epileptic," or "epileptiform."

A man, 23 years of age, consulted me for seizures of several kinds.

Six years ago he suddenly lost consciousness in a theatre; was told he struggled. Except that next day he was sore, he could tell me no more of this fit.

Three years ago, when standing in his office, he suddenly fell down insensible, but quickly recovered after water had been thrown on his face, without a struggle. He had a second similar attack in a fortnight.

About three months later, he found one morning that his tongue was bitten, and again a few months later still. No doubt on each of these occasions he had had a convulsion in the night.

About two years ago, he had attacks of loss of sight. He

had four or five altogether, over a period of twelve months. He was a very intelligent man and he described clearly what he experienced. He said that things would grow *gradually* more and more indistinct until he could scarcely see anything. It would seem to reach a point, and then return again. It was like a film; no sparks, flashes, or colours. It would come on when he was quite still at his desk, and had come on when walking. He had no giddiness accompanying the sensation, but headache for an hour, or for several hours, followed it. There was no trace of loss of consciousness. In reply to a leading question, he said he felt sick when the attack was on, but he had never vomited. It was difficult to get to know how long the failure lasted. He thought about a minute. (The discs are quite normal.)

Now for the last year he has had seizures of another sort. "Feelings," *i.e.*, he explains, a "half stupor" and "half recollection of a dream coming over him." He is told that he turns pale; he never falls; they last about a minute. He "seems to get into a perspiration," and feels hot. As it leaves him it gives him a twinge in his bowels, as if he must go to the closet immediately.

In the following case, in spite of the circumstantiality of the account first given, it was quite clear, on further investigation, that the so-called losses of sight were attacks of *petit-mal*. It is recorded in order to show a kind of case I do not include under the term Epileptiform Amaurosis. The first paragraph contains the account first received.

A single woman, 17 years of age, supposed to have good general health, consulted me for fits. She was subject also to *sudden* losses of sight. She would all at once pass into complete darkness. Her mother remarked, that if she passed her hand before her daughter's eyes there was no blinking. The fits the girl had were always preceded by the loss of sight, but the loss of sight was not always followed by the fit. In the fit the head turned to the left, and it was said she "worked" on that side of the body.

This case loses the peculiar significance the above report implies, when it is added that the girl at the time

when her "sight failed," turned of a "blue-black;" that she dropped anything she had in her hands, although she did not fall, and that during the attack she spoke strangely and also indistinctly. There is no evidence that in these attacks the optic nervous system was particularly implicated. The patient lost herself altogether, rather than her sight only.

Dr. Homberger has published a very interesting paper on this subject. I should refer also to Mr. Zachariah Laurence's paper on Functional Affections of the Retinæ, in the British Medical Journal.

CLINICAL NOTES ON PYRAMIDAL CATARACTS, WITH SPECULATIONS AS TO THEIR CAUSE.

By Jonathan Hutchinson, F.R.C.S.

Under the terms "central cataract" and "pyramidal cataract," ophthalmic surgeons have, from early times, recognized the occurrence of little isolated opacities on the front of the lens. As these are almost always more or less elevated, and as the term "central" is liable to be confused with "nuclear," we may perhaps conveniently employ only the term "pyramidal." In rare cases the pyramidal form is very definite, and a little hillock of opacity, a line or two in height, projects forwards into the pupil. Viewed by oblique illumination these opacities are very beautiful objects, presenting sharp edges, and reminding one of a miniature iceberg. All observers seem to agree in the following statements respecting them :—

That they are usually found in both eyes, and are exactly symmetrical.

That they are easily picked off by the needle.

That in many cases, if not in most, they are not attended by opacity of the lens substance at other parts, and that the patient may go through life without any special tendency to complete cataract.

That in a certain number of cases, however, an opacity is met with also at the posterior pole of the lens, and that in others there are striæ of opacity through the whole of that structure.

The fact that they are very frequently met with in those who have suffered from purulent ophthalmia in infancy has attracted the attention of all, and has even led to the suggestion that they are due to the occurrence of central perforation of the cornea and consequent deposit of lymph on the most prominent part of the lens.

It is to the theory of the cause of these opacities that I now wish to ask attention. The evidence in support of the popular belief that they are in some way due to purulent ophthalmia appears to be very strong indeed. I have recently met with a number of facts tending to support it, of a kind not as yet, I think, adverted to, and much stronger than those which merely concern the occurrence of the one with the history of the other. I allude first to cases in which the cornea shows still persisting evidence of damage, and, secondly and chiefly, to cases in which but one cornea shows evidence of former ulceration, and the pyramidal cataract is found in but one eye. These non-symmetrical cases seem to me to give very valuable evidence. During the last few years I have collected the particulars of about six or eight cases, in which the patient gave the history of ophthalmia in infancy, had an opacity of greater or less extent on one cornea only, and had a pyramidal cataract on one lens only. In all these cases the corneal opacity and the cataract were in the same eye. In addition to these, I have seen two or three others of pyramidal cataract on one side only, in which no corneal opacity was present in either eye, but I have never met with any exception to the statement that if corneal opacity and cataract occur in the same patient they are found in the same eye.

With regard to the fact that in almost all the cases in which patients exhibit pyramidal opacities they give us the history of infantile ophthalmia, it is one, I believe, which all surgeons will bear out. In support of it I may just state that in several cases I have treated the patient for the attack of ophthalmia and afterwards found that an opacity on the lens was present. In most instances we are obliged to be content with second-hand testimony as to the ophthalmia.

Holding then that it is exceedingly probable that purulent ophthalmia in infancy does in some way or other influence the formation of these curious opacities, we come

next to the question as to how it is done. The facts on this head seem to be these. In the great majority of cases of pyramidal cataract there is not the slightest evidence of damage to the cornea, and not the least reason to suspect that a perforation has ever existed. In those in which there is a corneal opacity still, as a rule, there is no synechia nor any evidence of actual perforation. Now and then in the rarest cases a single slender film is found passing from the cornea to the lens, but these are most exceptional. It is impossible, when we find the cornea brilliantly clear in every part, to believe that perforation has ever taken place, for we have no facts by which to credit such an hypothesis. Then, again, we must bear in mind the fact that all who have examined these opacities agree in stating that they consist not of lymph on the surface of the lens-capsule, but of deposit in the epithelial layer beneath the capsule.

The theory which I would venture to support is this: that the mere proximity of the inflammatory action on the surface of the conjunctiva and cornea suffices to disturb the nutrition of the lens capsule, and to produce deposits. It is, of course, admitted that the lens surface is, during infancy, in very close proximity with the posterior surface of the cornea, so that such disturbance of nutrition may be more easily possible than it would in adult life. Still, if this hypothesis be tenable, we have, in the occurrence, a most interesting example of the pathological possibility that diseased action may, by a sort of vital catalysis, disturb a structure with which it is not in continuity, and when there exists between the disturbing and disturbed tissues a structure (cornea) which is wholly unaffected, and a layer of fluid of greater or less depth.

As regards the structure of these little pyramids there can, of course, be no doubt that they are produced by overgrowth (fibroid) of the sub-capsular epithelium, and the chief marvel is that they should usually be so remarkably limited in extent. An excellent paper by Mr. Hulke,

recording researches on this epithelium, will be found in a former volume of this Journal. (Vol. i, p. 188.) Mr. Hulke writes of cataracta pyramidata, "In ophthalmia neonatorum, when the cornea has become inflamed and swollen, its posterior surface may actually come into contact with the front of the lens, and then a dot of lymph poured out upon the latter by the inflamed cornea, or even the mere pressure contact, may give rise to opacity by preventing the proper nutritional osmose through the capsule." The prominence of the lens in the infant's eye, to which also Mr. Hulke draws attention, is undoubtedly a very important fact, but inasmuch as the deposit is always beneath the capsule, it is not easy to accept the suggestion that it results from a dot of lymph from the posterior surface of the cornea. The fact, first noticed, I think, by Mackenzie, that a little corresponding opaque dot is sometimes (very rarely) seen on the posterior surface of the cornea, further helps us in associating the cataract with the ophthalmia, though it scarcely goes so far as to support the theory of perforation, as supposed by some authors. Against the idea that perforation is an essential stage, we have numerous facts:—

1st. The perfect transparency of the cornea in almost all cases.

2nd. The great rarity of iritic adhesions.

3rd. The circumstance that the opacity is sub-capsular.

Mr. Hulke states that he agrees with those authors who consider that these opacities do not project outwards, but that they are really "embedded in the substance of the lens." He even asserts that the base of the cone is towards the capsule. Fully admitting that they are sub-capsular, I cannot but think that the imbedding is a condition only occasionally present. I have examined several unusually large and beautiful cones by means of oblique illumination, and can feel no doubt that their points stood forwards and projected considerably above the level of the lens-surface.

I cannot but suspect that we adopt hypotheses which are too mechanical, when we attribute these little opacities either to corneal perforation or to prevention by pressure of nutritional osmose. As regards the latter, we must remember that there is excess, not deficiency, of growth. The production of cataracta pyramidata probably illustrates the power which inflamed surfaces have of influencing the nutrition of (and inducing cell growth in) parts which are in proximity with them, but not actually in structural continuity. We may perhaps, without absurdity, count the increased temperature, to which the front of the eye is exposed, often for several weeks, during a period of active developmental change, as a factor of some importance.

The three following cases illustrate the occurrence of these opacities in one eye only, and with evidence of ulceration.

Case I.—*Pyramidal Cataract in one Eye, with Opacity on the Cornea, and Convergent Squint and Oscillations of Globe.—History of Inflammation of the Eyes in Infancy. Hypermetropia.*

Charles Rooke, æt. 22, became an out-patient on the 5th July, 1868. He stated that he had had "bad eyes" in infancy. Both were inflamed, but the right more so than the left.

Both his eyeballs were now continually oscillating, and his right squinted inwards. He could only make out the letters of 200 (Snellen) at 5 ft. with his right eye. With his left he made out 70 at 20 ft. He was slightly improved by convex glasses.

Ophthalmoscopic examination: The globes oscillated so much, that the inspection of the fundus was difficult.

The left eye. The media were quite clear, the choroid was somewhat pale, but there were no patches in it; the vessels of the retina were small, and the optic disc was of a pale, greyish tint, its margins being very obscure, as if from partially recovered neuritis.

The right eye. There was a large dense opacity in the centre of the cornea, to which the inner part of the iris adhered. The rest of the iris was quite free, and the pupil dilated well. No

bands could be detected passing from the opacity to the lens. On or in the anterior part of the lens there were two opacities, at a very short distance from each other. One was the ordinary circumscribed white patch in the capsule, exactly in the centre, and about half as large as a pin's head; the other was a similar patch, but about twice the size, less dense, and less abruptly defined, and placed perhaps half a line behind the first in the cortical substance of the lens. Some very delicate striæ could be seen connecting these two. The rest of the lens was clear, with the exception of a few small striæ passing inwards from the deeper opacity, about a third of the distance to the circumference of the lens. The vitreous in this eye was clear, and the condition of the optic disc was very similar to that of the left eye.

Case II.—*Pyramidal Cataract in the one only; Small Opacity in the Cornea, with a single tag of Iritic adhesion.*

A boy, æt. 10, was admitted on February 14, with the following condition in his right eye: There was a pyramidal cataract on the centre of his lens, a small opacity in the middle of the cornea, and a very small tag of adhesion, extending from the iris to the opacity. The history given was the usual one, that he had had purulent ophthalmia in infancy. It had affected both eyes, but the right more severely than the left. The existence of the synechia anterior makes it certain that perforation occurred. There was no cataract in the other eye.

Case III.—*Pyramidal Cataract in one Eye only, with Opacity of Cornea, &c.; History of Ophthalmia in the same Eye in Infancy.*

A boy, æt. 4, was brought to me on account of rather extensive but superficial opacity of the right cornea. He had convergent strabismus of the same eye. On examination, I found also a minute pyramidal cataract on the centre of the lens. The other eye showed no defect of any kind. The history was that at the age of four, he had caught cold in the right eye, and had suffered from a long attack of inflammation. The other eye was not affected.

NOTES OF MISCELLANEOUS CASES,

By Jonathan Hutchinson, F.R.C.S.

(Continued from page 48.)

No. XXIX.—*Paralysis of Radiating Fibres of the Iris and of the Ciliary Muscle without apparent cause and without other complication.*

At page 137 of our preceding volume I have recorded a case in which complete paralysis of the radiating fibres of the iris occurred without complication and without any known cause. Thus we had a pupil of medium size and quite motionless. In that case failure of the function of accommodation gradually supervened and became complete. Only one eye was affected, and the man is, I believe, at the present time (15 months from the beginning of his disease) in good health, but with his iris and ciliary muscle of the affected eye quite paralysed. There has been no failure of any other muscle in the orbit. During the last few months two similar cases have come under my notice, and one of these I now record—

Mr. E——, a very healthy looking, married gentleman, aged about 35, and who had never suffered from syphilis, came under my care, April 2, 1867. He complained that he could not see clearly with the left eye, and that he had lately had shooting pain in it and around it; the pain had not been severe. The eye was not in the least congested, and presented no unusual appearance excepting that the pupil was a little larger than the other. The sight was good, and I found on covering both eyes that the right pupil dilated whilst the left remained at its original size; the left was absolutely motionless as regards accommodation. I found that his distant vision was good, though he complained that objects looked a little hazy. He could read Snellen No. 4 at 4′ but not nearer, with + 15 he read No. 1 easily at 12″.

The right eye was perfect and its pupil acted well.

We now proceeded to examine as to the cause of this paralysis of the left vaso-motor nerve. I could make out

nothing definite, Mr. E. was in good health, living in the country, and coming up to his office every day; all his functions seemed perfect, pulse quiet, 80. He said that he had not had any anxiety or over-work, but remarked that he was peculiarly susceptible as regards changes in the weather, and liable to sciatica and other forms of neuralgia. There was no tumour in the neck, nor any indication of aneurism.

Mr. E. had not recently suffered from tooth-ache, but he had experienced several severe attacks of sciatica, for the last of which after much unavailing drug treatment he had been obliged to resort to hydropathy, by which he had been nearly cured. As regards the inconvenience which this state of things had induced, it concerned chiefly the circumorbital pain and the dimness of sight. There had been no diplopia, and all the movements of the eye were executed well. Mr. E. could, with both eyes open, read well, but he complained that he soon got fatigued and that the two eyes seemed to bother each other. Although he focussed the type only with the right, yet he said that he could read more easily with both open than with the left covered.

In certain features a very close correspondence will be found between this case and the one which I recorded a year ago. In neither could any special cause for the paralysis be discovered, both patients were healthy adult men, and both engaged in office occupations. In each case the first symptom was immobility of the pupil. In the first paralysis of accommodation gradually followed and advanced to completeness, whilst in the second the same course is in progress, the loss of accommodation being as yet incomplete.

To judge by the want of success with treatment in the first case the prognosis is not hopeful. The worst result to be feared is, however, a complete paralysis of the ciliary muscle, and of the dilating power of the iris.

No. XXX.—*Blindness from White Atrophy (Tobacco smoking). Curious symptom of profuse Ptyalism, probably of cerebral origin.*

Patrick Bowlse, aged 50, an Irish carman, now living at Selby, Yorkshire, came to me on account of total blindness. I examined his eyes with the ophthalmoscope by direct sunlight, and

he did not even perceive the light. His right eye had failed first. "It was in the reading I first noticed it; I never had a pain or an ache in it." The other did not fail till some months afterwards. He complained very much of a constant flow of water in his mouth, it used, he said, "to run out over his lips, and in the night it ran down my throat. I was never thirsty. I was very sleepy. I could sleep all my time out."

He was also giddy. Sleepiness, profuse discharge of saliva, and giddiness are the three symptoms which he mentioned to me over and over again. When I saw him on September 20th, 1864, he had been quite blind about three months.

The right pupil was twice the size of the other, and very sluggish; the left was of normal size. He was a married man and had a grown up family. He was a short-set, robust-looking man, but rather pale. He told me that he had smoked for 20 years 3 ounces of tobacco a week, and sometimes more.

On examination with the opthalmoscope I found both optic discs quite white. They were abruptly round and a little depressed by atrophy but not much. There was not a trace of the pink colouring natural to the disc. The arteria centralis, however, was of moderate size, perhaps two thirds of what is normal, and the vein also was quite up to the natural size.

The rest of the fundus shewed no change.

The man could walk well, and said that he felt in good general health; he still complained much of the flow of saliva in his mouth.

In entertaining the suspicion that this man's amaurosis is due to the influence of tobacco, we must ask attention to the fact that it is very difficult to suggest any other cause. Excepting certain other equally obscure symptoms all referable to central disease of the brain, or to disease of the nutritional nerves, he has had no failure of health; drowsiness, giddiness, ptyalism, and amaurosis, the last permanent, the former passing off as this became complete, such is the curious combination of phenomena. These, too, occur in a steady, temperate, married man, a little beyond middle age. He is not a man of developed intellect, and has not over-worked either his eyes or his mind, nor has he been subject to mental anxiety. A fact which may perhaps explain why the tobacco, which he has used so freely for so many years, has only poisoned him after such a long interval of immunity must be

mentioned. During the greater part of his life he has been an Irish car driver, leading an active life in the open air, and probably counteracting the influence of tobacco by a free allowance of whisky. Three years ago his children, who have come over to England, persuaded him to follow, and practically he retired from work. He kept up his smoking and probably having nothing to do he increased it, and this whilst he was staying most of the day in the house and drinking less than formerly.

With regard to the ptyalism I enquired carefully as to whether he had been taking mercury, and found that he had not. It was probably due to an irritable condition of the nerves supplying the salivary glands, and is a symptom similar in nature to excessive perspiration, irregular appetite, sickness, &c., when they occur in connection with nerve disturbance. I should add that the man had never had an injury to the head. The entire absence of headache and pain, and also of paralysis, makes it very improbable that he is the subject of a cerebral tumour.*

No. XXXI.—*Twins born Blind—Examination of the Eyes of one of them—But slight evidence of Disease of the Optic Discs.*

James Field, now aged 9, was one of twins. When they were three months old their mother discovered that they were both quite blind. They never even noticed the light. Before this as their eyes were quite bright she had not suspected anything. Until weaned they were healthy babies, but after that both remained weak and puny. One died at the age of three years, having never been able to walk. The other began to thrive when his brother died, and has ever since had good health; neither of them appear to have had symptoms of syphilis. Their mother had borne four children before the twins, and has had one since, all of whom are living and all have perfect sight. She is not aware that any of her relations or of her husband's relations have been blind. Nothing special occurred during her pregnancy, excepting that when about four months gone she one day suddenly met a friend who had been some time in Australia, and who whilst there had become blind; she was much pained at seeing him.

* Since this case was written out, I have had another example of profuse spontaneous ptyalism in connection with white atrophy of the optic nerves.

The twins were, in infancy, exactly alike, so much so that they had to be marked in order to know them.

State of the Eyes.—The globes roll much and this symptom was noticed in infancy. The pupils are of normal size, but dilate widely with atropine.

In both eyes the media are quite clear; the disc in each is a little pale, and its structure slightly hazy, as if from former neuritis, but these changes are not to any great extent. The central artery and vein can be easily seen in both, but the arterial twigs are diminished in size. The margins of the discs are not so definite as usual. The choroids appear normal. The examination was made under difficulties, as he could not steady the eyes. The right disc is paler than the left, but neither of them are advanced in atrophy. The boy is well developed, intelligent, and has good use of all faculties excepting that of sight.

No. XXXII.—*Double Pan-ophthalmitis in a young Child—Varicella suspected—Destruction of both Eyes.*

I first saw Mr. Cuthbert's child on Saturday November 22nd. Mr. Simpson, with whom I attended, told me that he had been first called in two or three days previously, and had found it as he thought suffering from cerebral irritation. He lanced the gums. The day before my visit, it was noticed that the child kept its eyes shut, and that the lids were a little swollen.

At the time of my visit the lids were much swelled, and I had to use a speculum to secure a good inspection. There was no discharge whatever, and the conjunctiva was only moderately congested. The two eyes were exactly alike; the cornea in each eye was steamy, the iris had lost all brilliancy, and in the anterior chamber were a few small shreds of lymph, which had not gravitated to the bottom but lay irregularly on the iris. The pupil in each was occluded by lymph of a light greenish tint, which as it did not overlap the margin of the iris, clearly came from behind it. The iris was pushed forwards, there were no nodules of lymph adhering to it. It appeared clear to me that the disease was not iritis, but rather a general inflammation of the globe.

Our patient was a pallid flabby child, a year and nine months old. Its gums were hot and red, its mouth shewed aphthæ, and

its tongue was rather dry. I was told that it took almost nothing and slept but little. Although looking so ill, I was assured that up to within ten days it had been very active and perfectly well. Its father was a member of the City Common Council, and it had of course had every comfort. It had in fact only recently returned from the sea side.

In searching for some cause for this most unusual condition, I made special enquiry as to whether any exanthem had preceded the ophthalmitis. On stripping the child we found a few small scars, very like those of chicken-pox, and its mother stated that ten days ago there had been a slight rash out consisting of "small watery heads." There were other children in the family and they had all remained well. The mother had been recently confined and still kept her room, the child's early symptoms had therefore been somewhat overlooked.

It did not appear to me that there was room for active treatment by mercury. We ordered belladonna fomentations, with cinchona and chlorate of potash internally. Three days later the flakes of lymph in the anterior chamber had almost disappeared, but the pupils remained as before. The tension of the globes seemed already somewhat diminished.

After this the corneæ regained perfect transparency, but the globes softened, and became reduced in size. In each the vitreous was opaque, and eventually the lens also shared in the change. The irides remained dull. The child recovered its health slowly. It is at present quite well, but quite blind, and with clear corneæ.

Remarks.—I have seen but very few cases at all similar to this. In some respects the form of ophthalmitis resembled what I have seen in pyæmia, but it is very rare in that disease for both eyes to suffer. We had besides no definite indications of pyæmia; the child was very ill, but no abscesses occurred elsewhere. I think it exceedingly probable that varicella had been present, and this exanthem is, I believe, much more than any other liable to be followed by severe complications of a pseudo-pyæmic nature. I have repeatedly known multiple abscesses and severe illness follow chicken-pox. Dr. Mackenzie has given us a most excellent account of an epidemic of fever in Glasgow, in which many patients suffered from ophthalmitis of a kind somewhat similar to that which occurred in this case. De-

structive inflammations of the eye have also not been infrequent during the recent prevalence of spotted fever with spinal meningitis in Dublin.* But in most of the recorded cases of ophthalmitis from fever the inflammation was not symmetrical.

As regards treatment I may state that the child was so ill that I did not venture to give mercury; we contented ourselves with the local use of atropine, and chlorate of potash and bark internally. At the date of my first visit the eyes were clearly lost.

No. XXXIII.—*Paralysis of the right fifth Nerve fifteen years after Syphilis—Inflammation of the Cornea—Careful Treatment from an early stage—Entire loss of the Eye.*

I saw Mr. S., a gentleman from Dublin, with Dr. R., on October 24th, 1867. He had been under Dr. R's. care for some weeks, and had for long been out of health under the treatment of different physicians. His ailments had been chiefly in connexion with the head, violent headaches, &c. Dr. R. had suspected syphilis, and had obtained from Mr. —— the admission that he had had a chancre fifteen years ago, which was followed by secondary symptoms, for which he was treated by M. Ricord. Since then he had married and his wife had borne healthy children. The reason for now consulting me was that one eye had inflamed. Dr. R. told me that the attack on the eye had been preceded by great irritation in the side of the nose and pain in the forehead.

I found that the first division of the fifth nerve on the right side was quite paralysed, and the second partially so. He could not tell when his eye was touched, nor when a pin was thrust into the skin of his forehead. The right side of the upper lip was numbed, but not entirely so, and in the chin he could feel well. The masseter and temporal muscles were in good condition. The eye had been inflamed for a week. The conjunctiva was much congested and swollen, and the lids were also swollen and loaded with vessels. There was a superficial ill-defined hazy patch in the centre of the cornea. Ulceration was commencing, but as yet no marked ulcer had formed.

* See an able paper by Mr. Wilson in Dublin Quarterly Journal.

The pain had already been somewhat relieved by iodide of potassium. We carefully protected the eye, and continued the iodide in full doses (thirty grains three times a day). On more careful enquiry there seemed to be not the least doubt as to the disease being syphilitic. Several times during the long interval since the original disease he had been treated by specific measures for periosteal swellings, &c. A few months before I saw him he had had a slight epileptiform attack; he had been salivated on several occasions, and had always found it remove his symptoms. Until I examined him he had no idea that one side of his face was anæsthetic.

It would be tedious to record in detail our treatment, it may suffice to say that from the first I kept the eyelids closed by plaster and covered with lint and bandage. Sensation in the parts supplied by the second division and in the side of the nose returned. At first the ulcer seemed inclined to heal, and then it relapsed. Then hypopyon appeared, and this was absorbed but again quickly returned. From this stage the progress was steady from bad to worse. In addition to the iodide we gave small doses of grey powder for three days and to mild ptyalism. This was not tried until the corneal ulcer and the hypopyon were well advanced, and it did not appear to influence the case.

When at length the anterior chamber was half full of purolymph, and almost the whole cornea involved in the ulcer, it was decided as a last resource to perform iridectomy. Some difficulty was added to the operation by the bulging rim of chemosis. The anterior chamber filled with blood; only about half the lymph was removed. The operation was done without chloroform and caused not the slightest pain. The destructive processes went on more rapidly after the operation than before. The cornea quickly gave way, and in a week the whole of it had disappeared, leaving the iris exposed. On December 10th I excised the iris and ciliary rim of sclerotic in order to allow of better healing. The lens had already escaped, and the vitreous was opaque with lymph. The operation was again quite painless. At this stage the eyeball was pushed out of the orbit by swelling, such as in other cases of severe pan-ophthalmitis, and although the globe was anæsthetic there was much aching around it.

The process of healing was rather tedious, owing to the con-

tinued suppuration from within the globe. At length, however, it healed soundly. He now wears an artificial eye. The conjunctiva is still quite devoid of sensibility.

Remarks on the Case.—The first point to which I have to ask attention is one of anatomy. Our patient quickly recovered sensation in the cheek, lower eyelid, and side of nose, indeed in these parts the loss had never been complete. During the time that the inflammation of the cornea was at its height, and whilst that structure was totally devoid of sensation he could feel in the lower lid and side of nose almost as well as on the sound side. Now the nerve which gives sensation to the lower part of the nose and its tip is the oculo-nasal, the same that gives a branch to the lenticular ganglion. It is probable that this nerve had been restored, and therefore probable that it has nothing to do with the sensibility of the cornea and conjunctiva. Although sensation was good in the lower two-thirds of the side of the nose, it was wholly lost at the upper part just adjacent to the inner canthus, the part supplied by the supra-trochlear branch. This abrupt limitation of the sensory paralysis and its results seems to me well worth keeping in mind in reference to what occurs in herpes ophthalmicus, in which we often see the eruption limited in the same way. In that disease I believe that it is the clinical fact that the eye does not inflame materially unless the eruption comes out on the side of the nose to its tip, the very part which escaped in this instance.

My next point is to note that the inflammation had no peculiarities excepting that it was wholly without pain, and wholly without intolerance of light. It is startling to see a man with an acute ulcer on his cornea and great congestion of the eye opening the lids in a full light without the slightest inconvenience and allowing you to examine it to any extent. But this absence of irritability was the only feature in which the inflammation differed from that of a healthy cornea. We had first a superficial ulcer, then a larger and deeper one, and next hypopyon. As more of the cornea became involved the conjunctival congestion increased, and chemosis was produced, and when finally the cornea gave way the adjacent irritation increased, and we had such swelling of the orbital cellular tissue that the eyeball was pushed forwards out of the orbit, so that the lids could not be closed. The whole process to entire destruction of the cornea

occupied about three weeks; rapid changes were noticed several times; twice the ulcer almost healed and then relapsed, and once hypopyon, to the extent of a large drop of pus, wholly disappeared in twenty-four hours. The absorption of the hypopyon occurred whilst he was using hot fomentations, so hot that they scalded his forehead and nose and brought out vesications.

As regards the treatment of inflammations in paralysed parts, we may note first that two of our most useful remedies in other cases are here of no value. I allude to counter-irritation and to anodynes. Opium is undoubtedly most efficient in the treatment in other eyes of corneal ulcers which threaten perforation, but here we had no pain to subdue and no irritation to control. It is highly probable that blisters and other counter-irritants act only through the reflex endowments of the nervous system, and that they, too, can have no effect in an inflammation in which irritation of sensory nerves has no part.

It may be doubted whether the application of cold to tissues deprived of nerve influence would be safe, and a degree of anxiety, though less would also attach to the use of heat. In this case we tried local heat most zealously in the form of fomentations, and at first with apparently very good results, but afterwards with none. Would the *continuous* use of heat have been better, say in the form of a hot-water bag?

Local depletion by leeches was twice resorted to, but with no perceptible effect. Our main aim seemed to be to try to restore the nerve as quickly as possible, and meanwhile to protect the eye. These objects we carefully attended to, but with the lamentable want of success which I have recorded.

During our attendance on this case, our unfortunate patient frequently pressed us with the question, was it possible that the other eye might suffer in a similar manner? He was, of course, dismayed at finding that the disease seemed so little under the control of treatment. Mr. Dixon and Mr. Critchett, as well as myself, had to answer his question, and we all replied clearly that we had never known both eyes suffer. During the last month, however, I have seen an example of symmetrical paralysis of the fifth nerves from syphilis, and symmetrical inflammation of the cornea as a consequence. The patient was a gentleman sent to me by Dr. Barker, of Melbourne, Australia, and I may probably, at a subsequent time, publish his case.

Injury to one Eye followed by Reflex Iritis in the other—Excision of the injured Globe—Iridectomy for the recurrent Iritis—Statement of result, seven months later.

Cases of sympathetic ophthalmitis are amongst the most anxious with which we have to deal, and but too often lead to the worst results in spite of all that we can do. The fact that the eye which we have to treat is usually the only one left to the patient, of course adds greatly to the surgeon's sense of responsibility. I record the following case as a most valuable fact in favour of the timely performance of iridectomy in order to prevent recurrent attacks of iritis. It will be seen that the excision of the eye originally injured, and from which the inflammation of the other had its rise, did not prevent the continuance of the disease. Under these circumstances, with the eye already much damaged and in a most critical condition, the iridectomy was performed. Sufficient time has since elapsed to fairly test its effect, and we are justified in considering that it has saved the organ.*

W. Wilson, a healthy labourer from Lincolnshire was admitted on Jan. 21st, 1867, his right eye having been lost by an injury three months previously. On October 9th, he was chopping sticks, when a piece flew up and struck his right eye. The iris and ciliary region were wounded. He had no sight from the time of the accident, and the eye remained hot and painful, but without any acute inflammation. A month after the accident his other eye became weak and watery. He described it as feeling hot, and he was much troubled with lachrymation. The pain was sufficient to keep him awake at night. When he came up to the hospital two months later, the reflex inflammation of the left had commenced. The pupil of this eye was almost closed. The iris was muddy and swollen, and there was a distinct zone of ciliary congestion. The lost eye was soft and shrunken, its pupil completely closed. It should be stated that

* The reader may be interested in referring to an abstract of a paper on this subject, by Von Græfe, given in our Periscope.

almost from the commencement of the reflex inflammation in the left, the pain in the right had ceased. Although however he had no pain in the right, I felt no hesitation in advising him to have it removed, and this was accordingly done. On examining the globe afterwards, I found the iris and ciliary processes on the outer side involved in a puckered cicatrix. The lens and vitreous were absorbed, the retina was wholly detached and a thin brownish fluid occupied the space between the choroid and retina.

To continue the case as regards his left eye, I may state that we administered bichloride of mercury, and used atropine freely, with the result that the iritis quickly subsided, and all traces of congestion and irritability ceased. He could now see to read although the pupil was occluded in the centre. In about a fortnight he returned home. Five weeks later he returned to the hospital with a relapse of the iritis. There had been no pain whatever in the orbit from which the globe had been excised. The recurred attack of iritis was rather severe, and there was much ciliary congestion. It subsided quickly under the use of bichloride of mercury and atropine. The tension of the globe was slightly increased, but not much. I advised him to have an iridectomy done in the hope of preventing fresh recurrences of inflammation, and to this he consented.

March 14.—The pupil was irregular and occluded by lymph at its lower part. He could read No. 19 (J.). An iridectomy was performed upwards.

18th.—A little fresh iritis had been excited by the operation, there was a little lymph in the new pupil, and slight inflammation about the edges of the wound. He had a little pain the first night after the operation. He could only read No. 20 (J.).

21st.—He could read No. 16 (J.).

25th.—His sight was still better, but he could not quite read No. 14 (J.). There was less irritation about the eye. He now returned home.

May 30th.—He had had no relapse. There was still slight ciliary congestion, and the pupil was occupied by lymph, which prevented his seeing well. He could only read No. 16 (J.).

In October he again came to town at my request. Since his last visit there had been no recurrence of irritation in the eye, and he had been able to follow his occupation. There was now

no congestion whatever. He read 16 (J.) easily, and with + 14 could read 8.

I saw him again ten months after the operation, and he still remained free from relapses.

No. XXXIV.—*Double Pan-ophthalmitis in an Infant—Pyæmia?—Abscesses in Cellular Tissue of various parts—Destruction of both Eyes.*

The following case came under my observation at Moorfields, in September of the current year.

George Jones, æt. 18 months, was a healthy infant until ten weeks ago, when he was attacked by "an inward fever." A month later a succession of abscesses in the cellular tissue occurred. None of the joints were involved. Both globes inflamed and suppurated. The lids were greatly swollen, and he appeared to suffer extreme pain in the eyes.

No other illness occurred in the family. He is now only just well of the abscesses. He is emaciated and very pale. The left globe is shrunken, and the entire cornea lost. The right cornea is perforated by a large central ulcer, into which a button of discoloured iris, the size of a pea, bulges.

He now eats well, and does not appear to be in pain.

This case is of some interest in connexion with that recorded at page 146. In this, however, the corneæ and not the deep parts suffered.

AN ACCOUNT OF SOME PATHOLOGICAL SPECIMENS RECENTLY ADDED TO THE MUSEUM OF THE ROYAL OPHTHALMIC HOSPITAL.

By Bowater J. Vernon, F.R.C.S., Curator.

Specimen I.

The right eye of a lad, æt. 11 years, removed by Mr. Critchett in August, 1867.

Intra-ocular growth Invading the Tissues of the Orbit.

History.—All that could be gathered from the lad and from those who brought him, was that the eye had been blind after an attack of inflammation when he was a baby, but had been no trouble to him until the last few weeks; during that time, however, it had become prominent and everted, and occasionally very painful.

The eye was very prominent and enlarged with a T + 2, but the opaque scar-tissue, which represented the cornea, did not allow any very thorough examination. Excision of the globe was advised.

There was some difficulty in completing the operation, as the eyeball was embedded in a firm mass of a growth, which filled up the back of the orbit.

The eyeball and tumour were examined by a vertical section, and, in order, to show the colour of some of the tissues, a tinted sketch of the fresh section was made.

The specimen showed a new growth within the globe, which having made its way through the sclerotic, surrounded it on its under and posterior aspects. The situation of the iris and ciliary body were marked by the dark line of pigment at the lower part of the specimen, but there were no traces of the cornea, anterior chamber, or lens.

Another dark line running horizontally across the solid contents of the globe divided them into two very different portions,

and apparently represented the remains of the choroid which had been driven inwards.

In front of this line the tissues were very vascular, and blood oozed from many small pinkish-coloured points; the whole of this part, too, was studded with small glistening yellow earthy deposits.

A microscopic examination of this portion showed it to consist of imperfect cells of different sizes, with a large quantity of a granular intercellular substance, this latter was full of capillary blood-vessels. The bright yellow specks above-mentioned were of an earthy nature.

The other portion was of a greyish colour very translucent, tolerably firm, and entirely destitute of new blood-vessels and the yellow earthy deposits, the new tissue, of which it was composed, seemed to have blended with the choroid and retina, though not a trace of the latter could be found, and after filling the posterior half of the globe, to have made its way out and spread around it in the orbit. There was no appearance of any actual perforation of the coats, but the growth seems to have chosen the course of the optic nerve for its exit.

A distinct portion of a similar substance was found in the apex of the orbit.

The appearances of this part of the growth under the microscope were very striking, apparently it was made up of small and distinct cells, of uniform size closely packed together, with one or more nuclei, and spherical in shape, but with hardly a trace of any intercellular substance. There were no traces of capillary vessels or any evidence of earthy degenerations. The elements which composed the growth in the orbit had exactly the same appearance.

Specimen II.

A firm yellow Intra-ocular Growth of Uncertain Duration.

The left eye of J. H., æt. 10 years, removed by Mr. Critchett in September, 1867.

History.—The lad was very dull and stupid, and had never complained of his eye until seven weeks before seeking advice at the hospital; at that time he thought he "had a cold in it."

This condition of things lasted about three weeks, and then he found he "was blind of that eye."

When he came to the hospital the globe was distended laterally, its T + 2, the deep vessels of the sclerotic distended, and there was a good deal of congestion of the conjunctiva and lids, the lens was opaque, and he had no perception of light. As he was in a good deal of pain the eye was removed at once.

A vertical section through the optic nerve and eyeball showed a firm lobular growth of a yellow colour, springing from the entrance of the optic nerve, and filling the lower two-thirds of the vitreous chamber, the remaining part of this being filled with flocculent lymph.

The growth consisted of two distinct lobes, the smaller and posterior lobe, springing from the termination of the optic nerve, had driven the choroid before it, then, bursting through this, had spread itself into the vitreous chamber, forming the other and larger lobe, and reaching as far forwards as the back of the lens. The lens was opaque, but in its proper position.

On microscopic examination no trace of the retina could be found, the growth was formed almost entirely of pale but distinct and well-formed cells (very like white blood cells but smaller), with here and there a well-marked intercellular matrix of very fine fibres, and a few spindle-shaped cells.

The "flocculent lymph," mentioned above, contained very many perfect but much larger cells, full of nuclei, and very many smaller cells in different stages of development, all of them pale, and hardly if at all connected together.

Although no specimen could be preserved, the account of the post-mortem examination of a case of intra-ocular growth spreading backwards to the brain, and causing speedy death, seems worthy of record here.

W. I., a sturdy little boy, æt. 4 years, was brought to the hospital in September, 1866, on account of a "yellow appearance" in his right eye, which his mother had noticed for some few weeks.

Examination with the ophthalmoscope showed very plainly the retina detached and bulging forwards. The vessels on the detached retina were very evident, and though the structures behind the retina were somewhat transparent, it was considered probable that the detachment was due to some growth behind it.

For some months the child was lost sight of, and when seen again by Mr. Hulke the globe was prominent, everted, and much restricted in its movements. It was assumed that the growth had now involved the orbit, and, to give the child a chance, Mr. Hulke removed the eye. As the hospital was full, the operation was performed at the Middlesex Hospital. At the time of the operation, though there was no growth in the orbit, yet the optic nerve appeared much thickened up to the optic foramen. The eye was examined by Mr. Hulke, and has been thus described by him in Vol. XVIII Pathological Transactions :—

"On dividing the eye after hardening it in alcohol, it was firm, and filled with a pinkish-grey vascular growth specked with small white dots of earthy and fatty degeneration. The growth sprang apparently from the optic nerve and retina, and had infected the choroid and sclerotic at an early period before it had distended the eyeball.

"The histological elements were small, round, roundly oval, and spindle-shaped cells, ranging from $\frac{1}{4300}''$ to $\frac{1}{2730}''$ in diameter, with one or a couple of minute nuclei, and a faintly granular cytoplasma, and these cells were embedded in a scanty intercellular substance, homogeneous, finely granulated or obscurely fibrillated. None of the normal retinal tissues were discernible, but the elastic lamina of the choroid was recognizable, and in the portions of tumour involving the choroid pigmented cells were not unfrequent."

At first the case did well, but in January 1867, a month after the operation, from the bulging of the eyelids and walls of the orbit it was evident that a recurrence of the disease had taken place; in February a vascular sloughy-looking mass had protruded from the orbit, and there appeared to be considerable enlargement of the frontal and right temporal region. The child did not appear to suffer, but became extremely emaciated, its weakness at times being much increased by hœmorrhage from the growth, which had reached the size of a large orange, and was of a most repulsive character.

On September 11th, in Mr. Hulke's absence, the mother told me the child had died on the 7th, after having been very drowsy, sick, and very much convulsed during the last days of his life.

I went at once and examined the head, a task of some difficulty, as decomposition had been very rapid. On removing the

scalp I cut through a soft pink mass like brain-substance lying between the pericranium and the skull at the situation of the posterior fontanelle. At first it seemed as if this had made its way through the bone from within; this, however, was not the case, for when scraped away the bone beneath it was smooth and intact; the patch was about the size of a half-crown in extent and half an inch in thickness. Along the course of the superior longitudinal sinus were several smaller patches of a similar nature, the skull cap was very thin, and when held to the light it was easy to see that in places the diploe was filled with the same pinkish-looking substance. On removing the dura mater the entire brain was softened and decomposed; these changes were more advanced in the right hemisphere, this part appearing to have been hollowed out into a sloughy irregular cavity which contained some recent blood clots. There was a direct and ragged communication between the cavity of the orbit and the sloughy part of the brain, and the finger could readily be passed into the mouth, nose, or antrum, owing to destruction of the orbital walls. I could find no trace of optic nerve.

There were some enlarged glands behind the right ear; these, with some of the brain-like deposit beneath the scalp, were removed for more minute examination.

Of the microscopic appearances of the gland tissue I could not lay much stress, but the morbid deposits undoubtedly consisted of very simple spherical cells of a uniform size, without any intercellular substance.

Specimen III.

The right eye of a woman, æt. 66, removed by Mr. Critchett, October, 1867.

Melanosis, associated with symptoms of Glaucoma.

History.—The eye first failed two years ago. At that time she saw "flashes of light" and "cobwebs," suffering occasionally from severe pain in the brow and over the whole of the right side of the head. Since then her sight had been gradually lessening, and during the last few weeks had been totally lost.

A very severe attack of pain had induced her to apply at the hospital.

The globe was shrunken, flaccid, and the cornea very hazy, the lens was opaque and was displaced downwards, where it might be seen swinging to and fro.

A small black growth was attached to the under and posterior part of the sclerotic, on section through this the white sclerotic showed no trace of perforation; the contents of the globe consisted of a greyish black mass the size of a small nut, corresponding in its situation within to the smaller and darker growth without the globe, situated behind and detaching the retina.

This inner substance consisted of what appeared to be débris of cells, with a considerable quantity of pigment scattered throughout it, but no well-defined cell structures.

The external growth was composed of large and well-formed cells, irregular in size and shape, but all closely packed with very dark pigment.

Specimen IV.

The right eye of a man, æt. 35, removed by Mr. Soelberg Wells, September, 1867.

Hæmatocele of the Eyeball, Simulating a Melanotic Tumour.

History.—Five months before coming to the hospital he received a severe blow upon the eye while chopping some wood; there was no wound, but he was unable to see afterwards. Two months after this he had another but very slight blow upon the eye, and from this time it became painful and began to enlarge.

He came to the hospital with the lids swelled and dusky, the eyeball very prominent, very much enlarged, and in the upper ciliary region there was a staphylomatous bulging of a deep black colour, and very tense. He was in considerable pain, and said at times he had suffered very severely.

It was thought that the case was one of rapid melanosis, and immediate extirpation of the globe was advised.

During the operation it was impossible to distinguish the ocular muscles, and from the large size of the globe the dissection was very difficult, so much so that in spite of all care

it was wounded posteriorly, this was followed by a gush of bloody fluid and collapse of the globe.

The eyeball on examination was found to have been reduced to a mere bag, in which hardly any traces of the normal structure of the globe could be recognized, its sole contents seeming to consist of a dark coloured fluid with some partially decolorized blood clots adherent to the sclerotic. The sclerotic appeared to have been distended and then to have split in many directions, corresponding to those rents, the continuity of the wall of the bag had been maintained by the orbital fascia, and the expanded tendons of the muscles. The sclerotic was much thickened, very brittle, and its inner surface of a yellow colour, an appearance much resembling that of an atheromatous artery.

Remarks on Specimens I, II, III, *and* IV.

The rough appearances no less than the minute examination of specimen I, lead to the belief that it is an example of a soft glioma, and not a true cancer, commencing probably in the framework of the retina or the optic nerve. The peculiar features it presents correspond in a remarkable manner to the description given of such tumours by Virchow, and with the appearances of the tumour examined and described by Mr. Hulke in the Pathological Transactions.

In specimen II probably is an example of a more mixed kind of tumour, slower in its growth, and less certainly springing from the retina, what Virchow calls a glio-sarcoma.

Specimen III has at least two points of interest—what was the connexion of the glaucomatous symptoms with the presence of the new growth? were they the consequence of the growth and increase of the tumour, or is there any especial tendency towards the appearance of new growths in eyes which have been destroyed by glaucoma? Probably it will be impossible to answer this question finally until an eye shall have been watched through all the stages of glaucoma, a condition of things not likely to occur. The other point of interest is, the manner in which secondary tumours are formed outside the coats of the eye-ball, when very careful examination can detect no actual perforation. In cases where the growth without the eye has reached any considerable size, it is always easy to see a distinct

continuity between the growth without and that within the eye, but where the secondary tumour is very small, it is often impossible to detect any continuity of the two growths. In conversation with Dr. Knapp, of Heidelberg, he stated his belief that the secondary growth was due to migration of cells through the coats of the eye, and not by means of the connective tissue around the blood-vessels or lymphatics.

Specimen V.

Tubercular deposits in the Choroid in connection with acute Tuberculosis.

History.—(Kindly supplied by Mr. S. Wells.)

M. J. P., a little girl æt. 8, was admitted on November 5th, 1867, into King's College Hospital under the care of Dr. Garrod, with symptoms of acute tuberculosis. She had become rapidly emaciated during the last month, and had during that time suffered from dypsnœa and dry cough. On admission there was great febrile disturbance, pulse 132, respirations 66, temperature 101°. Slight dullness of left side of chest, and crepitation about the second intercostal space. November 6th.—Temperature 106, pulse 148, respiration 96. Urine acid, no albumen. Puerile respiration on right side, slightly tubular on left. The eyes were examined by Mr. Soelberg Wells with the ophthalmoscope, and tubercles in the choroid were diagnosed. November 11th.—The patient grew rapidly worse and died on this day.

Post mortem examination by Dr. Kelly.

The brain substance was apparently normal, but on the superior aspect of the left hemisphere were seen two or three small opacities in the pia mater. Both lungs were filled with miliary tubercle. Liver and heart healthy, kidneys contained tubercles in their cortical substance and were throughout congested. Capsule of spleen had some tubercular (?) deposits, the organ itself being healthy. The mesenteric glands were somewhat increased in size and number, and some solitary glands of small interstices were enlarged. The surface of the peritoneum was healthy.

Examination of the eyes during life.

Mr. Soelberg Wells found that the eyes appeared externally

quite normal. The sight was perfect (No. 1 Jaeger). The field of vision normal. The refracting media perfectly transparent. With the ophthalmoscope it was found that the optic nerve and retina were healthy, the retinal veins slightly dilated; the outline of the disc perfect. In the choroid—which was otherwise perfectly normal—were noticed numerous small, circular, prominent greyish-white nodules, which were chiefly situated in the vicinity of the optic disc, more especially in the region of the yellow spot. Towards the periphery of the fundus they were more sparsely scattered. The epithelium of the choroid around the nodules was only very slightly altered in appearance, the cells being evidently opened up or parted aside by the nodules, and there was no agglomeration of pigment around the latter, but the thinned portion of the epithelium passed insensibly over into the normal condition. At some points a nodule could be seen lying beneath a retinal vessel which passed distinctly over it. The nodules were prominent, but whether or not the retinal vessel was arched forward by the tubercle could not be accurately determined, as it was quite impossible to distinguish with certainty, as to the presence of a parallax, on account of the restless movements of the patient's eye. The condition was very similar in both eyes.

Examination of the Eyes.—After death the eyes had been preserved for two days in glycerine and water, and were soft and flaccid.

On cutting them open, the vitreous humour escaped like water, the retina was softened and detached, and the layer of pigment-epithelium lining the choroid had been loosened and carried off with the vitreous humour.

(Both eyes were placed in a weak solution of chromic acid. The right eye has not been any further touched, *the left* has been examined minutely.

The anterior portions of each showed nothing to note, and have not been preserved.)

Both eyes presented similar appearance when examined with the naked eye, or still better with a pocket lens. The inner surface of the choroid was studded with a number of pearly white spots; twenty or thirty could be counted in each eye, situated around the entrance of the optic nerve, more numerous on its outer than on its inner side, and much more thinly scat-

tered over other portions of the fundus; the largest were of the size of a millet seed, the smallest no bigger than a pin's point; their surfaces were smooth, and though some of the largest of them appeared to be elevated, they could not be detached. Their outlines were distinct except where one or two of the smaller ones seem to have become blended together.

When the choroid was separated from the sclerotic, the spots could not be seen through the thickness of the choroid. When examined *in situ* with low microscopic powers, it was not possible to trace their connection with any of the larger choroidal vessels.

When higher powers were used—the one employed generally was $\frac{1}{5}$th inch—the following appearances were noted:—Many sections were made through the patches and the surrounding choroid. In all, the layer of pigment-epithelium was almost entirely absent, but in all, the elastic lamina of the choroid was perfect and quite normal. Internally to this there were large numbers of colourless cells of uniform size, closely packed together, each containing one or more nuclei, and except that they were smaller, not to be distinguished for the cells of pus or lymph.

Where the section had been made through the largest patches, it was evident that the apex of the mass of cells was appreciably elevated above the level of the surrounding tissues, and that the prominence was due to these cells being amassed between the elastic lamina and the chorio-capillary tissue.

The outer layer of these cells blended gradually with the stroma of the choroid, and cells of a like character and appearance were scattered thickly amongst the dark pigment cells of this coat.

At this spot however, the cells were not so uniform in size, here and there were larger cells, full of nuclei, and the cell-walls could not so easily be distinguished.

Part II.

A Periscope

OF

CONTEMPORARY OPHTHALMIC LITERATURE.

ON THE ETIOLOGY OF GLAUCOMA.

By Dr. Adamink, Assistant in the Ophthalmic Clinic of the University of Cazan, Russia (Annal. d'Oculistique, July and August, 1867, page 1).

Dr. Adamink believes that he has made an important advance towards a correct knowledge of the stages which constitute the glaucomatous process. He thinks that it is in alterations of the extra-ocular circulation that we must find the explanation, hitherto vainly sought in other directions. "We must admit," he writes, "that increase of tension is not the essential cause of glaucoma. It is much more reasonable, on the contrary, to suppose that the increase of tension is itself the result of the peculiar distribution of blood." Thus he refers the first change in tension to impediments offered by the sclerotic to the escape of venous blood, and argues that when once increase of tension has been induced, it can never disappear, but will tend (by pressure on the veins) to augment itself. Hence he infers the importance of a temporary relief by iridectomy or paracentesis, which may allow the veins an opportunity for emptying themselves. He explains the different degrees of glaucoma by suggesting that in some only the retinal veins are implicated, in others the posterior choroidal, and in the most acute cases all the choroidal as far forwards as the ciliary body.

He details the results of experiments in which the eye was separated from the external tissues, its arteries being as much as possible left intact, and ligatures being placed on its veins (venæ vorticosæ). In these the tension of the globe is found to increase quite up to that of complete glaucoma, but the changes in the retinal circulation do not show themselves so long as the retinal veins are not interfered with. The fact that the chief symptoms of glaucoma (distended veins, shrunken arteries, and increased tension of globe) can be produced by irritation to the ciliary region of the cervical cord is mentioned as another proof

that they depend on alterations in blood supply. The one weak point in Dr. Adamink's theory seems to be as to how the sclerotic is so altered as to impede the exit of blood. He speaks of loss of elasticity of the sclerotic, of thinning of it, and the opposite state or thickening, as conditions capable of effecting this result. But surely it is mere conjecture that any such conditions are present in glaucoma.

ON ENUCLEO-DISSECTION OF THE EYEBALL, ETC., ETC.

By Drs. J. and A. Sichel (*Annal. d'Oculistique, July and August*, 1867, *page* 56).

The Drs. Sichel (father and son) have written a paper on what they call Enucleo-Dissection of the Eyeball. The operation differs from the enucleation introduced by Critchett, and now so generally practised, in that, whilst scissors are used for part of it, and the muscles cut within Tenon's capsule, the bistoury is employed for its completion. It is adapted for cases in which there is disease of the tissues surrounding the eyeball, a tumour, &c. In connection with this "Méthode mixte et nouvelle," an interesting case is recorded. A young woman, who had lost one eye several years before, from repeated inflammations, applied to Dr. Sichel, with a melanotic growth from its anterior part. The globe with the growth and surrounding parts were excised. The retina was found detached, and the vitreous ossified. The growth was of the kind known as melano-sarcoma. The details of microscopic examination are given. The operation was performed in May, 1863, and as the case is spoken of as a cure, without either local or general return of disease, we suppose the patient has been recently under observation, although this latter fact is not explicitly stated. In the after-treatment bands of adhesion formed, and prevented the introduction of an artificial eye. These were repeatedly cut across, and touched with nitrate of silver, with the unusual result that they were finally got rid of.

TOBACCO-AMAUROSIS.

(*The Medico-Chirurgical Transactions*, vol. l, 1867.)

The unusually large volume of Transactions just issued by the Medico-Chirurgical Society contains only one paper bearing upon ophthalmic pursuits. It is a statistical paper by Mr. Hutchinson, containing a three years' experience of the form of amaurosis supposed to be in connection with tobacco. The author carefully distinguishes between cases of secondary atrophy, preceded by neuritis, and those in which the atrophy is primary (at least so

far as the optic disc is concerned). The latter only are the cases tabulated. It is estimated that a hundred cases of this kind are admitted at the Moorfields Hospital every year. The chief fact brought out is the comparative rarity of the disease in women. In a former report on this subject, Mr. Hutchinson had found the proportion to be three women to thirty-seven men, and in the present one we have thirty-four men to only three women. Almost all the men had been heavy smokers, and in a large majority of the cases no other cause could with any plausibility be assigned. In most of the cases there was little or no evidence of disease of the nervous system other than the amaurosis, the patients usually remaining in excellent health. Mr. Hutchinson discusses in some detail the other possible causes of disease which may be supposed to bear unequally upon the two sexes, and is unable to suggest anything more plausible than the tobacco hypothesis. Whilst avoiding the expression of any definite opinion, he yet urges that the evidence is quite sufficiently strong to make it an important duty on the part of the surgeon to advise abstinence whenever the early symptoms of this disease are present. He explains the general immunity of smokers by supposing that tobacco only acts prejudicially in certain peculiar constitutions, just as we know that some persons are easily poisoned by iodide of potassium, belladonna, arsenic, &c.

TUMOURS OF EYE OR ORBIT.

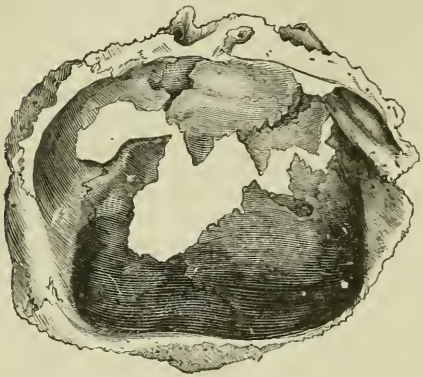
The Pathological Transactions, vol. xviii, 1867.

The last volume of the Pathological Society's Transactions contains several important records of eye cases, chiefly concerning new growths.

Mr. De Morgan gives us the sequel to his case of successful removal of a recurrent encephaloid tumour of the orbit. In this instance a growth of most formidable character had been removed from the orbit in part by the repeated and very free use of chloride of zinc, the whole of the soft tissues contained in that cavity having been made to slough out. The man was exhibited to the Society in February, 1866, apparently well. He died, however, in July, with a recurred growth in the brain. He had lived a year and eight months after the last operation. Cancerous deposits in addition to the large growth in the skull, were found in the glands around the aorta and adhering to the nerve trunks of the cauda equina. This patient during his last illness had complete vertical hemiopia of his remaining eye. The autopsy showed the cancerous growth completely involving the decussation of the optic nerves.

Mr. Lawson records a case somewhat similar to Mr. De

Morgan's, and in which the same kind of treatment was carried out. An elderly woman had her left eye ejected by a scirrhus growth behind it; she had also a cancerous wart on the cheek. Mr. Lawson excised the globe, and the greater part of the cancer; he then used the actual cautery to arrest bleeding, and lastly stuffed the orbit with lint, covered with chloride of zinc of paste. So effectually was the latter part of the plan carried out, that the entire orbital wall exfoliated. The patient did remarkably well, and the parts have now cicatrised. Wood-cuts are given showing first the exfoliated orbit (in one piece), and secondly the present appearance of the patient.



Wall of the orbit exfoliated after use of chloride of zinc.

Portrait of the patient after healing was complete.

It is quite clear from such instances as these that some cases of orbital growth hitherto thought too desperate for remedy, may by bold measures be brought, for a time at least, to a successful termination.

Mr. Zach. Laurence records the case of a man, aged 55, whose left eyeball he removed two years after it had been lost by an injury. A firm buff and partially black growth, the size of half a pea, was found surrounding the optic papilla. Dr. Wilson Fox and Mr. Hulke, who report on the specimen, agree with Mr. Laurence in regarding it as undoubtedly malignant. Many of the cell elements were large, and poly-nucleated.

Mr. Ernest Hart gives a case of fibro-plastic and melanoid tumour of the eyeball. His patient was a man aged 53, who had gradually lost his eye from a blow, six or seven years ago. The eyeball having recently inflamed and become painful, Mr. Hart removed the anterior half of it. The man wore an artificial eye with comfort for nine months, and then it became necessary to excise the stump, owing to a growth within it. The sclerotic had been perforated, and the tumour bulged into the orbital tissues. The optic nerve where cut across showed the sheath much thickened, and black matter within it, so that, to use the operator's words, "a nucleus for further growth was perforce left." The patient has as yet no evidence of return.

Mr. Hulke records three important cases of growths within the eye, and gives detailed and excellent reports as to their minute structure.

Case I.—*Spindle-celled Sarcoma of the Choroid.*—A porter, aged 46. Symptoms for three months before the nucleation. Tumour confined to the globe, and easily seen through the fixed and dilated pupil. The tumour had originated in the choroidal stroma, and its anatomical elements consisted of spindle cells, closely crowded in a scanty fibrillated intercellular substance. The capillaries were remarkably abundant and large. Operation performed October, 1866; patient still well.

Case II.—A little boy, aged 4, had his right eyeball excised on account of a tumour which grew from the retina and covered the optic disc, involving also the choroid and sclerotic. After enucleating the eyeball, the nerve was found to be diseased, and was accordingly removed close to the optic foramen. There was no disease visible in the orbital tissues, but as a precautionary measure chloride of zinc paste was used. The wound healed with a depressed scar, preventing the wearing of an artificial eye. Mr. Hulke describes the specimen as one of retinal glioma, but appears to believe that its elements originated independently in the several coats. He adds that retinal glioma differs from cancer in the non-occurrence of distant infection, and the presence in the growth of intercellular substance. It is a disease peculiar to childhood.

Case III.—A woman, aged 45, had her left eyeball removed on account of a melanotic growth from the choroid. Her symptoms had only been present for four months. The tumour was wholly within the eyeball.

ON RETINAL CHANGES PRODUCED BY EMBOLUS.

By Dr. Ph. Steffan, of Frankfort-on-the-Maine, Arch. f. O., xii, 1.

Dr. Steffan relates the case of a clergyman, 57 years old, of strong frame and healthy aspect, who summoned him at 8 in

the morning on the 29th of October, 1865, having lost the sight of his left eye during the night. The patient had been under treatment for a defect of the right eye, and the left was known to be of normal vision and only slightly presbyopic. Dr. Steffan found the vision reduced to quantitative perception of light in the central, upper, inner, and lower parts of the field; but in the outer part fingers could be counted at from 3′ to 4′, and single characters of 20 Jaeger deciphered through a 6″ lens. The ophthalmoscope displayed only very thin arteries, and veins seemingly pointed at their exit. On the 1st of November (4th day) the vision remained as at first, but a white film, covered the retina; this film was marked, and somewhat striated, around the papilla, still more marked, and of milky aspect, around the macula lutea, the centre of which appeared as a bright red spot. Vessels as before. On the 4th of November (7th day) the white film had increased, so that the margin of the disc was no longer clearly defined. On the 6th (9th day) vision was a little better, letters of No. 19 being deciphered on the outer side through a 6″ lens. The white film somewhat lessened; two small extravasations of blood on the margin of the disc, one below, the other on the outer side, of the inverted image. November 11th (14th day), vision as before, considerable diminution of the white film, so that the disc was once more sharply defined, the extravasations disappearing. November 16th (19th day), vision as before, a mere trace of the film remaining, extravasations disappeared. November 19th (22nd day) vision improved, with + 6 reads No. 18 Jaeger. Signs of commencing atrophy in the disc; still a trace of the film around the disc and macula lutea, the centre of the macula still bright red: the arteries as fine as hairs, the veins distended as at the beginning. From this time until April, 1866, examinations were made weekly. By December 9th the last trace of the white film had disappeared, and single words of No. 17 were read with + 6. By December 13th the bright redness of the macula was diminishing, and letters of No. 16 were read with difficulty. By December 27th the macula no longer appeared abnormal, and letters of No. 15 were deciphered. The arteries retained their diminished size, the veins were less distended, and exhibited the phenomenon of blood movement in intercepted columns, as described by v. Graefe and E. Jaeger.* Between December and April vision improved so much that the patient deciphered single letters of No. 14.

Assuming from this history the existence of an embolus, the author notes the absence of heart disease, and attributes the formation to some local lesion of one of the cranial arteries.

The ophthalmoscopic appearances were most important in the regions of the macula and of the disc. In the former the bright red spot, bordered by milky opacity, in the latter the opaque

* See Carter's translation of Zander, p. 135.

striation of a milky ground, were the points chiefly noticeable. The author assigns reasons for referring the striation to the fibrous layer, the milky opacity to the layer of ganglionic cells of the retina, and he combats Blessig's notion of fatty degeneration as a cause of these changes, on the ground of their speedy appearance and their eventual removal. The redness of the macula he attributes to hæmorrhage into the choroid, seen through the central and most transparent portion of the retina. The probable place of the embolus is discussed at considerable length, and the author is of opinion that obstruction of the central artery of the retina alone would be insufficient to explain the results, and would be repaired by the collateral circulation. He conceives the well-known case recorded by Schneller, in which partial recovery followed, to be an instance of this kind, and he recounts a history of the disorder that had attacked the right eye of the present patient as being probably of similar character. He thinks that an embolus that produces blindness must block up many or most of the posterior ciliary arteries, as well as the central artery of the retina. Such questions must await their final solution from post-mortem examinations, but the conclusions set forth in the paper under consideration are based upon careful and exhaustive reasoning.

TUMOUR OF THE ORBIT AND BRAIN.

By Prof. v. Graefe, Arch. f. O., xii, 2.

The subject of this case was a girl, six years old, a native of Aleppo, brought to the Professor in the autumn of 1864, on account of protrusion of the left eye. Early in her third year she fell, and struck her head severely on a staircase; and four weeks later suffered from feverish illness, which lasted fourteen days, and terminated in apparent recovery; but was soon followed by some deviation outwards of the left eye. By her fourth year the squinting eyeball began to project; and for six months its vision had gradually failed. The child had been free from pain and intellectual disturbance. When seen by Von Graefe she was of remarkable beauty, with blooming complexion, elastic skin, well developed muscles, and good spirits. Careful inquiry failed to discover any symptoms of disordered health. The right eye was perfect; and the only discoverable disorder was the protrusion of the left. This protrusion measured eight lines; and, especially during the last few weeks, the eyelids in closing were liable to pass behind the equator. The protrusion was caused by an orbital tumour, firm, but not of scirrhous hardness, with an anterior surface of uniform convexity. The movements of the globe were greatly restricted; but rotation

outwards, downwards, or upwards could be performed to the extent of a line; and the centre of movement was coincident with the centre of the globe, showing that there could be no great amount of adhesion of its posterior surface to the tumour. Vision was limited to the perception of a bright lamp at 6 inches distance, over a small portion of the temporal side of the field. The ophthalmoscope showed marked neuro-retinitis and swelling of the disc, with considerable mechanical hyperæmia.

There seemed no ground for refusing to operate. The existence of a growing tumour could not be doubted. The integrity of the eyeball, except for the neuro-retinitis produced by pressure, the preservation of some muscular action, the absence of scirrhous hardness or irregular surface of the tumour, and the healthy aspect of the child, all encouraged the hope that the tumour was defined and benignant. The absence of cerebral symptoms, the normal condition of the mental functions, the perfection of the vision, movements, and appearance of the right eye, all rendered it improbable that the tumour extended to the brain.

Prior to the operation a careful examination was made under chloroform, after luxation of the globe. The tumour was found to lie entering within the cone inclosed by the recti muscles, and the optic nerve was lost in its anterior surface. The globe being removed in the ordinary way, and a thin layer of adipose tissue divided, the surface of the tumour came into view. Its sides were found to extend to the walls of the orbit at several points, but were nowhere adherent to the periosteum. It was easily enucleated, except for one long process, which seemed to include the whole of the orbital portion of the optic nerve, and which was afterwards excised up to the optic foramen. For four days all went well, but on the fifth day sudden collapse occurred, followed by temporary recovery. On the tenth day collapse, followed by irregular pulse, acute headache, coma, and death on the twelfth day from meningitis.

The tumour was pronounced by Virchow to be glioma; and seemed to be completely limited. From this circumstance, and from the fact that the symptoms of meningitis only appeared ten days after the operation, when the orbital wound was already healing, it was surmised that some independent source of mischief would be found within the brain. This expectation was realized by the discovery of a tumour as large as a walnut, situated at the base of the brain, close behind the crista galli, and connected with another, more than twice its size, in front of the left corpus striatum. These tumours were described by Virchow as neuroglioma; and no union could be traced between them and the tumour of the orbit. The one seated at the crista galli completely enveloped the chiasma, and a portion of the right optic nerve, insomuch that the nerve fibres could not be certainly distinguished from the morbid growth around them.

V. Graefe remarks at some length upon the remarkable fact that such tumours should not only fail to produce symptoms from which their presence might be suspected, but that they should even fail to produce any symptoms at all. He points out that the symptoms of cerebral tumours usually depend, first, upon the interruption of the conducting function of the fibres invaded; secondly, upon the irritation of surrounding parts, often propagated along the nerves as neuritis descendens; thirdly, upon the pressure exercised upon blood-vessels, by which the nutrition of distant parts of the brain may be affected; fourthly, upon the increase of intracranial pressure, by which arterial ischæmia, venous hyperæmia, and serous transudation may be produced, together with general brain disturbance, and with the characteristic phenomena of arrested circulation (*Stauungsphänomen*) in the papilla. From the case related, and especially from the perfect function of the right eye, notwithstanding the complete engagement of its nerve in the tumour, he infers that the symptoms due to arrest of conducting power are of no very great value; and he suggests that the absence of other symptoms may have been due to the formation of the tumour at a very early period, even during fœtal life, and to its very slow growth during the time of infancy, when the power of the bones and of the soft parts to accommodate themselves to its pressure would be considerable.

ON THE TREATMENT OF TRICHIASIS AND DISTICHIASIS.

By Dr. U. Herzenstein, of Odessa, Arch. f. O., xii, 1.

Dr. Herzenstein advocates the destruction of the hair bulbs by the inflammation caused by the presence of a thread of silk used as a seton. He introduces the point of a needle on the margin of the lid, near the outer commissure, carries it in a vertical direction, and brings it out through the skin, a line and a half or two lines from the puncture. The needle is reintroduced at the wound of exit, and carried along the surface of the tarsal cartilage, under the muscle and skin, in a horizontal direction, to emerge about the middle of the lid. Again reintroduced at the wound of exit, it is carried on in a horizontal direction over the remaining half of the cartilage, to emerge just on the outer side of the punctum. Again reintroduced at the wound of exit, it is carried vertically, and made to emerge on the margin of the lid. The two ends of the thread are fastened to the cheek by plaister, and the eye covered by a compressive bandage. The thread should be moved daily, after the manner of a seton; and removed about the seventh day, or whenever sufficient suppurative inflammation is excited. If the disease be partial, the seton may be so applied as to include only the bulbs of the offending hairs, instead of the whole margin of the lid. Dr. Herzenstein also

pulls out the eyelashes at the time of operation. He cites cases in support of the plan, and avers that it is perfectly successful, and that, when the inflammation has subsided, it produces no change in the shape of the eyelid or its margin. He advises the use of blue protective glasses after the hair bulbs are destroyed.

ON THE CORNEAL EPITHELIUM AND ON THE MULTIPLICATION OF ITS CELLS.

By Dr. C. Schalygen, of St. Petersburg, Arch. f. O., xii, 1.

The author states that the corneal epithelium is arranged in three principal layers, of which the inner is composed of cells more or less columnar or wedge-shaped, standing vertically on Bowman's membrane, but penetrating into it to different depths, so that the general surface of the layer presents on both sides an irregular or indented outline. The cells are usually three or four cornered; and, when wedge-shaped, their points are directed externally. The middle layer consists of roundish, roundish oval, and angular cells, and the angles of many of the latter are more or less pointed and prolonged. The outer layer consists of flattened cells, which assume on the surface the aspect of plates or scales, and lie horizontally; while those of the middle layer are more or less oblique. All these cells contain nuclei; and the nucleus usually corresponds in form to the containing cell. The whole thickness of the epithelium is about 0·023‴ to 0·350‴, of which the largest portion is due to the inner, and the least to the external layer. The size of single cells ranges from 0·001‴ to 0·008‴; the largest being near the margin, the smallest near the centre of the cornea. The author proceeds to describe the effects of various reagents. The cells are distended by water and by dilute acetic acid, dissolved altogether by liquor potassæ, stained yellow by iodine, rendered granular by alcohol, hardened by Müller's fluid, and receive from solution of nitrate of silver a black deposit, by which their outlines and angles are rendered very clearly visible. Their multiplication takes place by partition commencing in the nuclei, and leading usually to the formation of two cells, sometimes of three, rarely of four. On this point the author speaks positively, from direct and repeated observation; and claims to set aside the contrary dictum of Henle.

REMARKS ON A CASE OF FRACTURE OF THE ORBIT.

By Prof. Manz, of Freiburg, Arch. f. O., xii, 1.

The author observes that an additional case of fracture of the orbit would not be worth recording, unless it presented points of

special interest. It is usually assumed that the blindness which follows such an injury must either be produced directly, by violence done to the eyeball or optic nerve, or indirectly, by paralysis of the optic nerve consecutive to brain lesion. The latter supposition he believes to be incorrect; and he attributes the secondary blindness usually to inflammation of the optic nerve and retina.

A youth of 19 received a blow on his right eye from a bean stick. The immediate effects were ecchymosis, slight ptosis, slight deviation of the eye outwards, some dilatation of the pupil, and impairment of memory. Three weeks afterwards he received a blow on the head from his master, followed immediately by severe headache, and he came to Prof. Manz, a fortnight later. At that time he was feeble, pale, and tremulous, with an aspect of suffering, the right eye closed, and the levator paralysed. The inner angle of the orbit was tender to the touch. The eyeball deviated outwards about one line, and retained normal mobility, although its movements inwards and outwards were painful. The media and iris were natural. The ophthalmoscope showed considerable neuro-retinitis. The retina was universally turbid, the papilla of a dirty grey, its margins obscured and interrupted by radiating whitish streaks. The vessels were much dilated, winding, and here and there lost to view. In the left eye the veins seemed somewhat over full. Notwithstanding these changes, vision was little impaired. That of the left eye was normal, and the right read No. 4 of Jaeger readily at 10″. The state of the patient rendered it impossible to test the field of vision. Two days later sickness and vertigo appeared, and the boy soon after died comatose. The autopsy revealed encephalitis and meningitis, with suppuration proceeding from a fracture of the roof of the orbit, and laceration and inflammation of the levator palpebræ, the superior rectus, and superior oblique. Within the eyeball, the disease was limited to the retina, or, as far as could be seen *post mortem*, to the optic disc and its immediate neighbourhood. The vessels were much enlarged, and from the disc itself projected a little excrescence, resembling the disc in colour and consistence. The morbid appearances stopped at the lamina cribrosa, and nothing abnormal could be discovered in the optic nerve or tract, other than some possible hypertrophy of the connecting element.

In some comments upon the case the author points out that the ptosis and the strabismus were effects of the direct injury sustained by the muscles, and were not paralytic; and that, if the patient had survived, the inevitable blindness would have been an effect of the neuro-retinitis discovered by the ophthalmoscope. He points out that neuro-retinitis may be of two kinds, the first due to inflammation of the connecting tissue, the second to obstruction of the venous outflow; and that these conditions (as in the instance under consideration) may be combined.

He considers the eye disease to have been produced, almost entirely, by the basilar meningitis—and to have had no connection with the inflammation of the brain substance, which was probably of earlier date.

HISTORICAL NOTE ON HYPERMETROPIA AND ASTIGMATISM.

By Dr. A. Nagel, of Tübingen, Arch. f. O., xii. 1.

Dr. Nagel quotes from a German translation of Janin's *Memoires et observations sur l'œil*, (Paris, 1772,) a complete description of a case of extreme hypermetropia, and a full recognition of the state of refraction to which the symptoms were due. He quotes also from an inaugural dissertation by G. H. Gerson, published at Göttingen in 1810, an account of a case of myopic astigmatism, with a reference of the phenomena to the different curvatures of the chief meridians of the cornea. He therefore claims for Janin the discovery of hypermetropia; and for Gerson a place between Young and Airy in the history of astigmatism.

ON A DOUBLE PLANO-CONVEX EYE-GLASS.

By Dr. Hugo Gerold, Arch. f. O., xii, 1.

Dr. Gerold describes a case of extreme hypermetropia, in which the eye was acutely sensitive to the slightest inaccuracy of correction, and in which he could find no single lens that fulfilled the indications; the lens of 4″ focus being too weak for prolonged use of the eye, and that of 3·75″ too strong. He therefore devised a combination of two plano-convex lenses, set in a screw frame, by which their distance apart, and hence the focal length of the combination could be slightly varied. The lenses were respectively of 6″ and of 12″ focal length; the plane surface of the 12″ nearest the eye, the plane surface of the 6″ towards the convex surface of the 12″. When the lenses were in contact, the focal length of the combination was 4″; and by separating them this focal length was diminished. The combination fully answered the purpose expected from it, and the author gives a formula, by which the power of the second lens may be calculated for any given combination. For example, if a combination of three inch focal length be required: that is, $\frac{f' f}{f' + f} = 3$; and if a lens of 18″ be taken as one of the pair; then:—

$$\frac{18x}{18 + x} = 3 \therefore$$
$$18x = 54 + 3x \therefore$$
$$15x = 54 \therefore$$
$$x = 3{\cdot}6\text{;—and}$$
$$\frac{3{\cdot}6 \times 18}{3{\cdot}6 + 18} = \frac{64{\cdot}8}{21{\cdot}6} = 3.$$

So that the focal length of the second lens must be 3·6″. The same formula will serve for every combination that can be needed.

ON THE CENTRE OF THE CRYSTALLINE LENS OF THE FROG.

By Dr. C. Ritter, of Oberndorf, Arch. f. O., xii, 1.

The author commences by saying that he made some researches into the microscopic structure of the lens for the *Etudes Ophthalmologiques* of Dr. Wecker; but that time did not allow him to complete them to his satisfaction. His attention has since been specially directed to the centre of the lens in the frog; and he has obtained the following results:—The outer fibres of the lens are exactly semicircular with pointed terminations, and extend from end to end of its axis. This arrangement is continued inwards, layer after layer, concentrically, until the fibres of the inner layers do not exceed 0·003 mm. in length. These inner fibres become rather elliptical than semicircular, the long axis of the ellipse corresponding with the axis of the lens. Within the space enclosed by the smallest elliptical fibres is a central body composed of short fibres, each containing one well marked nucleus. These nucleated fibres are from 0·0015 to 0·0025 mm. in length, and present very irregular outlines. Their long axes are nearly parallel to the axis of the lens; but they are irregularly packed together. Between them and the ordinary non-nucleated fibres are found irregular fibres like the former, but themselves non-nucleated, and with pointed terminations. The author thinks it probable that an analogous plan of structure may be found in other animals; and suggests that such an assemblage of irregularly packed nucleated fibres would impair the transparency of the geometrical centre of the lens, and may thus supply a reason why the geometrical centre is placed externally to the axis of vision.

CASE OF INSUFFICIENCY OF THE EXTERNAL AND INTERNAL OCULAR MUSCLES.

By Dr. Leopold Kugel, of Bucharest, Arch. f. O., xii, 1.

Dr. Kugel was consulted by a youth of 18, student at a military college, on account of an increasing asthenopia that

almost entirely prevented any use of the eyes. There was no failure of accommodation, and in each eye a very slight degree of simple hypermetropic astigmatism, wholly insufficient to explain the symptoms. Attention was then directed to the muscles, and it was found that:—

The patient saw any object, *e.g.*, a taper flame, singly, only when it was between 14 and 42 inches from his eyes, in the median line. When the object was nearer than 14″ the double images were crossed, when further than 42″ they were homonymous. This space, from 14″ to 42″ may be called the range of single vision. The more its limits were exceeded in either direction, the greater the distance between the images. The interval was purely one of lateral distance, the images shewing no upward or downward movement, and never being inclined. The supposition of insufficiency of both lateral muscles was confirmed by further investigation. The use of prisms shewed that the insufficiency of the external muscles was more marked than that of the internal. It was found that an equilibrium of lateral tension was established by looking at an object 34 inches distant, and, when the instinctive dislike of double vision was subdued by a deeply coloured glass before one eye, it was at this distance *only* that single vision existed. A movement of the object for a single inch, either backwards or forwards, produced two images. In looking at a flame 34 inches distant the patient could overcome a prism of 6°, and for a short time one of 8°, with the base external; but scarcely one of 4°, with the base internal. Using either eye only, the patient was normal sighted, but using both together he was only normal sighted over the already mentioned range of single vision; as soon as this range was overpassed the diminution of vision was extraordinary. Thus Snellen, No. 100, could scarcely be recognized at 6″, and fingers could not be counted at 8′. After various other details of the condition have been described, the author enumerates the following possible modes of treatment:—Exclusion of one eye from vision by an opaque glass, convex spectacles, prisms, prisms in combination with convex lenses, and, lastly, displacement (forwards) of the muscles by operation. Deeming the exclusion of one eye to be very objectionable, he is now making trial, for near vision, of prisms of 4°, with bases internal, in combination with 16″ convex lenses; and, for distant vision, of prisms of 6°, with bases external, in combination with 20″ convex lenses. If these should fail, operative interference will be recommended.

Correction.

Dr. Mackenzie has drawn my attention to an inaccuracy in the précis of No. 12 in the "Tabular Statement of Cases of Cysts in the Iris," contributed by me to the last number of this Journal.

Dr. Mackenzie's narrative of this case (On the Diseases of the Eye. Ed. 4, p. 704) does not mention the cause of the formation of the cyst. The immediately preceding paragraph in his work does not refer to this case, but to another, described at page 395, in which the cornea had been punctured with one of the points of a pair of compasses.—J. W. HULKE.

IMPORTANT ENLARGEMENT OF THE MOORFIELDS HOSPITAL.

It may interest many of our readers to know that it is in contemplation to make some important and extensive additions to the Royal London Ophthalmic Hospital, Moorfields. The number of applicants for relief have nearly doubled during the last ten years, and the want of suitable accommodation has become more and more evident. The appeals that have been made from time to time have been nobly responded to by the City, by several of the public Companies, and by our merchants, bankers, and others; and a sum has been raised that enables the Committee of Management to commence the new building, the plans for which can be seen at the Board Room of the Hospital. These additions will more than double the present accommodation for in-patients. There will also be some important improvements in that part of the building devoted to the purposes of instruction. There will be a roomy and well-contrived series of compartments for the use of the ophthalmoscope, where students can simultaneously pursue their studies in this most important department. A new museum, library, and lecture room are to be added, together with a larger and more convenient operating theatre. The Curator will thus be better able to store up and arrange for the purposes of instruction the numerous interesting morbid specimens continually accruing. Courses of lectures and demonstrations will be given by different members of the staff, so as to bring these various facilities for instruction into full practical operation. It is fully expected that all these important alterations will be completed during the present year.

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Part I.

Original Contributions.

A SECOND REPORT ON HERPES ZOSTER FRONTALIS (Seu OPHTHALMICUS).

By Jonathan Hutchinson, F.R.C.S.

Inasmuch as the history of a disease can never be safely written until a considerable number of examples of it have been carefully observed and recorded, I made no apology for the publication of such additional facts respecting Herpes Ophthalmicus, as have come under my care since my last report on this subject.* Amongst them I have to record some which displayed very unusual features.

One of them illustrates the remarkable fact that occasionally with herpes zoster, we have also paralysis of a motor nerve. In this instance the third nerve was the one affected (see on this point Case XVIII. at page 207). Another shows that now and then the middle division of the fifth is affected at the same time as the first. This I had

* My former report will be found at page 191 of vol. v, with other cases at page 331, and some additional ones at page 46 of the present volume. Mr. Bowman has given a very valuable paper on the same disease at page 1 of this volume, and Mr. Vernon also records some interesting cases in the St. Bartholomew's Reports.

never myself witnessed before, but Hebra has published a portrait, showing the eruption on the cheek as well as on the forehead.

A third is important, because it is to some extent an exception to what I had thought to be the rule, that whenever the side of the nose, *to its tip*, shows vesicles, the eye inflames severely. In this instance there were a few vesicles on the whole of the side of the nose, and the inflammation of the eye was only superficial, slight, and transitory.

The case, however, is not a strong exception, for the eruption on the nose was very slight. My rule ought, perhaps, to be modified a little. It would I think be quite safe to assert that the eye scarcely ever suffers much when the nose is not affected, and that the severity of the eruption on the one part is usually in direct relation with the severity of the inflammation of the other.

Before proceeding to record my cases, I may mention that Dr. Jeffries, of Boston, United States, has informed me in a private letter, that he has recently seen a case in which death occurred from this disease. The cause of death appeared to be the pain and irritation induced by the eruption. The subject of the case was a lady of eighty, in good health for her years. I have never myself seen a case in which death was threatened, although I have seen patients very ill from it. It is not uncommon, if the patient be elderly, for the illness to necessitate several weeks in bed. In reference to the escape of the eye, when the forehead only is affected, I may just mention that in the last number of this Journal, page 106, Mr. Hulke, records a case which supports my rule. The patient had herpes frontalis, which followed the course of the supra-orbital nerves only, and there was no nutritional disturbance of the eye either during the eruption, or afterwards.

In November, 1866, I published the case of a woman,

who, in connection with very severe herpes of the forehead and nose, had in addition to entire loss of sight, a dilated pupil, and complete ptosis. In commenting upon it, I remarked, that both mydriasis and ptosis in connection with herpes were new to me. In making that statement, I had entirely forgotten the case which I am about to give, the notes of which were then recorded in full detail in one of my journals. The man who was the subject of it called on me a few weeks ago, in consequence of a letter which I had written nearly five years before, to request him to do so. I had quite forgotten his case, but on looking up his name in my Index, I had the pleasure of finding the following very interesting notes. He has now wholly recovered, his pupil acts well, there is no trace of ptosis, and only some ill-marked scars remain as mementos of his illness. From his statement, it appears probable that the paralysis of the third nerve passed off in a few weeks after his attendance at the Hospital. I give the particulars of his case just as I find them in my note-book.

Case XXV.—*Herpes Frontalis in the Region of the Right Supra-trochlear Nerve—Paralysis of all the Branches of the Third Nerve on the same side—No Inflammation of the Eye—Complete Recovery from the Paralysis.*

John Ambrose, a cab proprietor, æt. 57, was admitted on March 24th, 1864, suffering from herpes of the right forehead, &c. He was a tall florid man in excellent health. He had formerly lived in Cambridgeshire and suffered from ague. His symptoms had commenced on a Thursday, exactly a week before his application at the Hospital, and had consisted in pain and "stuffing" in his nose.

Through Friday, Saturday, and Sunday he felt very ill, and had pain between his shoulders, and sickness. He did not actually vomit; he "felt shivery and gapish." On the Monday spots came out on his forehead, and he was now too ill to leave his home. On Tuesday the upper lid began to droop, and in the evening the eye was closed. His pain abated somewhat after

these symptoms were developed. He did not come to the Hospital till the Thursday.

Thursday, March 24th.—Present Condition and Remarks.— There is complete ptosis on the right side, and the eyeball is everted. He is quite unable to draw it inwards beyond the middle line. He cannot either elevate or depress it. The pupil is dilated to twice the size of the other, but it acts slightly on sudden exposure.

On the right forehead, from the root of the nose and adjacent part of the eyebrow upwards, is a group of herpes vesicles, and higher up on the top of the scalp are a few isolated ones. The eruption is mild and has been attended by but little pain. The spots come close to the middle line on the forehead, but none of them transgress it. They are all on the inner third of the right forehead, none on the outer two-thirds of the eyebrow or skin above it, nor any on the temporal region. There are none on the upper eyelid, though it is somewhat reddened, especially its inner half. The sight of the eye is perfect, and the superior oblique and the external rectus act well. He persisted in stating that on the affected temple and forehead he could not feel so well as on the other side; but I could not prove any material difference with the compasses.

The distribution of the eruption was in this case peculiar. It did not appear to follow the whole of the supra-orbital branches, but chiefly, if not solely that of the supra-trochlear. The outer two-thirds of the superciliary region were wholly free. The chief patch, a large one, was just over the inner third of the eyebrow, and corresponded exactly with the middle line of the forehead, all the way up to the hairy scalp. Above it were a few isolated vesicles, which were found nearly, but not quite, as high as the vertex. It should be noted that the man was almost bald. Probably a few filaments of the supra-trochlear find their way into the hairy scalp. The congestion of the upper lid may be explained by its contiguity to the diseased part, and the loss of sensation in the forehead (where it was free from vesicles), perhaps resulted from the severe counter-irritation of the eruption.

I have already stated that the man recovered both from the herpes and motor paralysis in a short time. The eruption had been but slight throughout, and there was never the slightest inflammation of the eye.

The occurrence of motor paralysis, together with herpetic eruption seems to favour the belief, that the starting point of irritation is central rather than in nerve-trunks. Dr. Broadbent has published some interesting observations on this point in a recent number of the "Medical Times and Gazette."

Case XXVI.—*Herpes on the Forehead, Upper Part of Side of Nose, and Middle of Cheek—No Inflammation of the Eye at First—Fixed Pupil and Hazy Cornea supervening one month after the Eruption, and persisting for several months.*

The following case has two very unusual features—first, the eruption came out on the cheek, and second, the eye did not inflame at first, but only several weeks after the herpes.

Isidore Lefevre, æt. 64, was admitted May 15th, 1868. His left forehead was covered with herpes, as also the upper part of side of nose, both eyelids, and the middle of his cheek as low as the lip.

The eruption subsided in the usual way.

At first his conjunctiva was congested, but there was no affection whatever of cornea or iris. It was not till about a month after the herpes that his cornea became slightly dim and the pupil fixed.

July 11th.—The forehead is now covered with scars, as is also the cheek down to the prolabium. There are none on the tip of the nose or its lower half. He has no material pain in the skin of forehead, and none anywhere sufficient to keep him awake at night. He has, however, some tenderness on the lower margin of orbit. The conjunctiva is congested. He can open the eye, but complains of a sense of dragging near the inner corner. The whole cornea looks fishy, *exactly like that of a fish*, deficient in brilliancy, but not actually opaque.

The pupil is more than twice as large as the other, and absolutely motionless both to direct and reflex stimulation. It

is oval from above downwards. The iris is not visibly inflamed, at any rate there is no lymph.

With oblique illumination and magnifying power the cornea is seen to be slightly pitted. The iris is quite clear, there are no visible adhesions. Vision $\frac{10}{100}$.

The cornea remained hazy for several months, and had not wholly cleared when the man ceased to attend.

CASE XXVII.—*Herpes Frontalis of Left Side—No Vesicles on Nose, and no Inflammation of the Eye.*

For the notes of the following case I am indebted to Mr. Wilcox (formerly House Surgeon to the Ophthalmic Hospital, now of Aylesbury), under whose care the patient was.

John Horton, æt. 44, steward, nervous and anxious because out of place. Has been attended for last month with abscess of thumb. Broken in health.

On Monday, March 12th, was attacked with great pain over left eyebrow, extending upwards over left anterior half of head, bounded by median line. On same evening he noticed raised red patches. On Tuesday morning the patches were covered with "blisters," about the size of peas. Eye was painful but not red.

Present state.—No pain, but very decidedly decreasing sensation over left anterior half of head. On forehead are several patches of brown hard crusts. Each scab when removed leaves a deep pit. One or two scabs in eyebrow near to nose. None on nose or eyelids. One patch partly on forehead, partly in hair of scalp. No scabs beyond median line. Entirely limited to left side.

CASE XXVIII.—*Herpes Frontalis of Right Side—Supra-Orbital and Trochlear Nerves affected—Single Ulcer on Cornea—No Iritis.*

Mr. Streatfield was kind enough to shew me the subject of the following report, and to give me permission to make a note of his case.

May 21st.—Thomas Cox, æt. 38. He came to the Hospital a fortnight after the eruption began. The scars were numerous on the forehead (right) and scalp, and there were one or two

on the side of the bridge of the nose. There had been no eruption on the side of the nose lower than the level of the inner canthus. He had been, he said, three days in bed during the acute stage of the eruption.

The eye had wholly escaped with the exception of a small ulcer on the lower and inner part of cornea. The iris was perfectly clear and the pupil active. The cornea was quite clear, excepting close to the ulcer, and the conjunctiva was but little congested. The skin of the forehead was but little numb, and not materially painful.

The ulcer on the cornea was possibly an herpetic vesicle.

In this instance the lower part of the nose wholly escaped, and it is interesting to note that although a single small ulcer occurred on the cornea, there was no inflammation of the deeper parts of the eye. The character of the eye-affection was quite different from that which occurs when the whole nose is involved.

Case XXIX.—*Herpes affecting the Forehead (Left), and, to a slight extent, the whole side of the Nose—Eye temporarily Congested, but escaping without permanent damage.*

Elizabeth Smith, æt. 62, came to the Ophthalmic Hospital on September 21st, with a severe attack of herpes frontalis. The eruption had been out about a week, and covered the left forehead, &c., and the left side of nose to its tip. The side of nose near to the canthus was covered, lower down the vesicles were fewer and not confluent, whilst near the tip they were quite small.

She was a tall, thin woman, and considered herself very nervous. There were few or no vesicles on the upper lid itself, and the eye although congested showed no special inflammation.

The pain for a few days had been very severe.

I saw her for the first time on October 1st, three weeks after the onset of the attack. The scabs on the forehead were then thick, and the scars on the side of nose very distinct. The eye was congested and the whole cornea a little hazy, the surface appearing a little blistered (very slightly indeed). The pupil under atropine dilated moderately, and was round.

January, 1869.—This patient recovered well from the herpes, but has continued to attend on account of the painfulness of the

portion of scalp involved. The cornea has perfectly cleared, and no damage has been done to the eye. The scars left are deep and extensive.

Case XXX.—*Very severe eruption of Herpes in the right Frontal region—No vesicles on the Nose and no inflammation of the Eye —Persistent pain in the part four years afterwards.*

This case came under my notice at the Hospital for Skin Diseases, where the man applied four years after the herpes, on account of severe pain in the skin of the forehead, which had still persisted. I transcribe notes taken at the time.

"A man, æt. 58, comes with deep scars of herpes frontalis on the right forehead and right upper eyelid. There are none whatever on his nose. He says that the scars were left by an attack of "erysipelas," four years ago. He now comes on account of the painful condition of the scalp, which prevents him from sleeping at nights. On the top of his head there is a bald patch of cicatrix; the cicatrices near to the middle line on his forehead are very deep."

"It would appear that he had a severe attack. He was in bed nine weeks. The eye does not appear to have been affected beyond superficial irritation. He says it was closed by swelling for four weeks."

"The pain has increased during the last two months. He complains of it most just above the orbit. He complains that the pain sometimes comes on the side of his nose."

Case XXXI.—*Herpes Frontalis et Nasalis—Slight transitory Iritis.*

I was indebted to my friend Mr. Morgan for an opportunity of seeing the following case:—William Henry, æt. 22. He had been admitted at the Ophthalmic Hospital on August 7, 1868, with well-marked frontal herpes on the right side. The vesicles had been but few in number, large portions of the skin being wholly free. They had occurred in the usual parts of the forehead, but few or none on the upper eyelid, or in the eyebrow. Two or three came out on the side of the nose, and a single one near the tip of the nose. He was not laid up by the attack, but kept at work.

When admitted (on the 4th day of the attack) he had slight iritis. Mr. Morgan used atropine, and the pupil dilated irregularly. Three days later, however, the atropine had wholly overcome the adhesions, and the pupil was large and round. There was some conjunctival congestion.

I saw him on September 10, more than a month after the beginning of the attack. The conjunctiva was still a little congested, as also the ciliary region of the sclerotic. There were numerous large purple veins passing backwards to the ciliary region. The pupil acted well, and he had perfect vision.

The scars left, although few in number, were very deep and conspicuous.

Case XXXII.—*Herpes Frontalis—No vesicles in the Nose, and no inflammation of the Eye.*

Mary Ann Clement, æt. 17, applied at the Ophthalmic Hospital on the third day of her attack. The eruption was strictly confined to the forehead, upper lid, and side of scalp. It did not transgress the middle line. There were no vesicles on any part of side of nose. Both lids are œdematous. The eye was not inflamed.

The case was a mild one and soon got well.

Case XXXIII.—*Herpes Frontalis, with a few spots on the side of Nose.—No material inflammation of the Eye.*

Mrs. Vernon, æt. 60, applied as an out-patient at the London Hospital on January 1st, 1869. She had suffered five weeks before from herpes of the right forehead, and now applied on account of the neuralgic pains which had been left. There were scars over the forehead on the left side, and she stated that the eruption had covered that part and the upper eyelid. She was one week in bed, and was treated for erysipelas.

In February Dr. Down, whose patient she was, was kind enough to send her to me for inspection. The scars were now (three months after the attack) but slight; there were not more than one or two on the nose, and the eye was quite clear. She told me that during the attack the side of the nose was painful, but showed scarcely any eruption. She still suffered from neuralgia, but it was getting better.

ON THE RECOVERY OF SIGHT AFTER ATROPHY OF THE OPTIC DISCS.

By Robert P. Oglesby,

Assistant Demonstrator of Anatomy in Leeds School of Medicine.

In a former Paper on the subject (*vide Lancet* for August 22, 1868), I adduced several well marked cases in which, after total blindness had resulted from atrophy of the optic discs, and had continued for a period of time ranging from weeks to months, and even years, recovery of sight ultimately resulted. I have now to record other cases of a similar kind, which I think may be the means of directing the attention of ophthalmologists more closely to this interesting subject. I have little hesitation in affirming, as stated in my former paper on the subject, "that a fair proportion of patients whose vision has been lost from atrophy of the discs recover a little sight, perhaps sufficient to enable them to earn a livelihood in occupations not requiring good vision. A much smaller proportion recover almost perfect vision, and are able to return to their usual employments."

There is good ground for believing that, in the largest proportion of these cases, the atrophy is the sequence of acute inflammation of the disc, and that vision is restored at an earlier period than when less of sight has resulted from simple atrophy.

In some cases of atrophy following neuritis, the disc resumes its healthy capillary tint, although marked whiteness has existed some time, and the disc circulation is occasionally restored in cases of simple atrophy, though I cannot positively state that such an atrophy has resulted in total blindness.

In my former paper I gave in full the notes of two

such cases. The one was a case of optic neuritis, the other a case of simple atrophy associated with loco-motor ataxy. In both cases the disc circulation was restored.

In the first case the right disc has not, as yet, recovered any visual power, and remains brilliantly white. The left disc, after remaining in an atrophic condition for more than two months, ultimately resumed a healthy appearance, and vision which was limited to shadows is now No. 1 Jaeger.

In the second case loss of sight occurred suddenly. On examination ten days afterwards, both discs were found to be atrophic (simple atrophy). Vision not 20 Jaeger.

There is reason to believe that these changes had been progressing by slight degrees for a considerable time previous to this sudden impairment of vision. The discs remained brilliantly white for three months. At the expiration of that time they gradually resumed their normal tint, and finally disc circulation was perfectly restored. Vision of each eye is now 4 Jaeger. Up to this time no further improvement in vision has taken place.

In the fourth case published, an attack of hemiplegia was temporarily destructive to vision, the patient remaining totally blind for four months. The sight of the right eye (the paralysis affecting the left side) improved more rapidly than the left. In April, 1867, the vision of the right eye was 4 Jaeger, that of the left limited to the counting of fingers; and this condition had existed for a length of time, not the slightest perceptible improvement having taken place. Since that time marked improvement has taken place in the vision of the left eye (*vide* Notes of Case V). In this case there is no alteration in the colour of the discs, they both remain very white; and it further bears me out in what I previously stated, as follows:—

"It is not, however, essential that an optic disc, once atrophied, should resume its normal appearance in order to regain its functional powers. In the remaining two cases, a lapse of time varying from four months to four

years occurred before vision began to return. Both patients were totally blind, both now enjoy good vision, yet in neither has the slightest alteration in the colour of the discs taken place along with restoration of vision. They remain brilliantly white."

The most instructive case is No. 1 of my former paper, in which I found the discs in an early stage of convalescence, so far as the recovery of sight was concerned. No alteration in their appearance having taken place. They remain very white.

The first symptom of returning vision in this case was the ability to discern the outline of a jet of gas which burnt brightly, without the knowledge of its exact situation. The next step towards recovery was the gaining of this knowledge, for the hand could soon be directed with precision towards any bright flame.

Vision in this case is improving, though as yet very slowly, and the patient has not reached the third stage of convalescence in which the discernment of colours takes place.

It will be well here to state what are these different stages of convalescence, and I cannot do better than quote from my former paper:—

"The early symptoms of returning vision in these cases appears to be, first, a passing glimmer here and again of a jet of gas or the blaze of a bright fire; afterwards, a pretty correct knowledge of the situation of the light so seen. In this stage, convalescence often remains stationary for a considerable time. The second stage is shown by a better judgment of the size of objects and of distance, and the patient can distinguish between an adult and a child, and begins to avoid objects likely to impede locomotion, such as chairs, tables, &c. In the third stage the discernment of colours is accomplished, and after this, recovery is generally very progressive."

I shall reserve for another paper the remarks I have to make upon the best means we can adopt to procure re-

covery of sight in these apparently hopeless cases of blindness from atrophy of the optic discs. The subject is one of such importance that a length of time must necessarily elapse before such a thorough knowledge can be gained as would justify one in coming to any definite conclusion. Nevertheless, I have little doubt that suitable treatment of disc atrophy, resulting from rapid inflammatory changes, is now more or less adopted by most ophthalmic surgeons. I can only add that increasing experience teaches me much may be done in the way of treatment with a beneficial result.

For the first three cases I am much indebted to Mr. Pridgin Teale, who has kindly allowed me to publish them.

Case I.

January, 1869.—Elizabeth B., æt. 43, states that she enjoyed good health till the summer of 1854, when she suffered from typhus fever. She had much delirium, but convalesced rapidly. Eyesight, before and after fever, very good. She has only once been pregnant, and then aborted at the fourth month. Menstruation is performed with regularity.

During the summer of 1868, dimness of vision came on rather suddenly—the sight of the right eye being the worst. About that time she was seen by Mr. Pridgin Teale. Vision of the right eye was then limited to the counting of fingers, that of the left to the reading of large print. Both discs presented well-marked examples of simple atrophy.

January 16, 1869.—Vision of the right eye after being limited to the counting of fingers for a considerable time, gradually began to improve. Now reads 16 Jaeger.

Vision of left eye. Can read small print.

Both discs are very white.

Case II.

December 14, 1868. Mary M., æt. 10 years, is an unhealthy, strumous-looking child. Her mother gives me the following history:—When about three years old, she suffered from some

brain mischief, and repeatedly had convulsions after convalescence appeared to have been established. Dimness of sight followed these convulsive attacks, and at the expiration of twelve months, had become so much worse, that she could not count fingers. Mr. Pridgin Teale then saw her, and found that both discs were atrophied (simple atrophy). The eyes remained in this condition for a considerable period (the mother could not remember the exact time, but positively stated it to be many months), then very slowly began to improve.

Present condition. Vision of right eye. 6 Jaeger.
Vision of left eye. Shadows only.

Both discs are white.

The following imperfect notes I copy from Mr. Pridgin Teale's case-book. Mr. Teale assures me that it is a case well illustrating the subject I am writing upon. This, of all the cases of which I give notes, is the only one I have not been able personally to investigate.

Case III.

November, 1866. Mr. P——. There are the remains of optic neuritis. Both discs are woolly, and commencing to atrophy on one side. Their margins are ill defined. The views are very tortuous and small. Vision, 50 Snellen.

September, 1867. Appearance of disc the same. Reads 30 Snellen.

December, 1868. Appearance of discs unaltered. Vision, 20 Snellen, easily. Letters of 15 Snellen.

Case IV.

During the month of August, 1867, Elizabeth M., æt. 50, suffered from typhus fever. She had much delirium, and pain in the head. During convalescence, vision, which had previously been good, began to fail, and total blindness resulted. She remained in this condition for several months. She could then see the blaze of the fire; three months after first seeing the fire, she could find her way about in the house. Vision is now so far improved, that she can read No. 6 Jaeger with either eye. The discs are atrophied.

Case V.

April, 1867. Sarah H., æt. 39, has been under observation for the past two years. She gives the following brief history: She has been delicate since puberty, having frequently suffered from bronchitis and dyspepsia. Her grandmother lost the use of one side shortly before her death, but no other member of her family suffered from paralysis. Four years ago she had two slight attacks of hemiplegia, which affected the left hand and leg. Sight was totally lost immediately after the fits, and returned only at the expiration of four months, when she could see the fire blaze. Since that time vision has gradually improved.

Vision of right eye: reads No. 4 Jaeger.

Vision of left eye: counts fingers.

Optic discs: both are pearly-white. Vessels small, but not tortuous.

January, 1869. The vision of the right eye is still No. 4 Jaeger, but there is great improvement in that of the left, for it is now No. 19 Jaeger.

Case VI.

January, 1868. Margaret S., æt. 32, a sickly-looking woman, gives the following history:—She is the mother of six children, three of whom are living; the remainder died in infancy. She has never enjoyed robust health. Nine months ago she was suckling a hearty, strong infant, being at that time unusually depressed and weak. Brow-ache, which at first was slight, now supervened, but increased in severity till the pain became almost unbearable. The pain continued for seven or eight weeks. During its continuance, impairment of vision was noticed, and it increased so rapidly that at the end of two months both eyes were blind.

Present condition. The right eye can just discern a bright jet of gas, burning at the distance of one foot.

The left eye is quite dark.

Both discs are raised and woolly, and slightly vascular—evidently the result of acute and inflammatory mischief.

March 10, 1868. Marked changes in discs. Both atrophied

and very white. The brow-ache has left her, but she suffers from vertigo.

May, 1868. The discs remain unaltered in appearance. With the right eye she can see the blaze of the fire at a considerable distance. The left eye remains dark.

June 16. Right eye counts fingers.
Left eye quite dark.

September 15. Begins to avoid objects in her way as she moves about the house. There is no improvement in the vision of the left eye. The discs remain unaltered in colour.

FURTHER OBSERVATIONS UPON AN IMPROVED METHOD OF EXTRACTING IN CASES OF CATARACT.

By Charles Bell Taylor, M.D. Edin., F.R.C.S.E.

Surgeon to the Nottingham and Midland Eye Infirmary.

[Read at the Meeting of the British Medical Association at Oxford, August 1868.]

In the year 1865 I called the attention of the profession to a method of extracting in cases of cataract, which I had found successful in several unpromising cases. Since then I have in the "British," the "Edinburgh Medical," and other journals, from time to time related such facts and cases as appeared to me worthy of record.

I now propose to give a *résumé* of the whole, and describe the best method of performing the operation.

The instruments that I employ are a pair of sharp forceps that pierce the sclerotic, a very light speculum (a modification of Von Graefe's), and two knives, a line in width and bent at an angle similar to the ordinary iridectomy knives, one with a sharp point, and the other with a blunt or bulbous extremity.

As the danger, even if vomiting occurs, is very slight with the form of incision I am about to describe, I usually prefer to have the patient narcotised, and, as a rule, push the chloroform to full anæsthesia. The lids should then be kept apart by the speculum, and the globe gently depressed with a pair of ordinary forceps in the operator's right hand. Having got the eye into a favourable position, it should be fixed by the sharp forceps at about the junction of the upper with the middle third of the cornea. The pointed knife is then entered in the corneo-sclerotic junction, one or two lines from the forceps, at the summit of the cornea, pushed well into the anterior chamber, and,

with a gentle sawing motion, the eye being steadied with the left hand, carried along the summit, a distance of three lines. The aqueous will now escape, and if we wish to extract without iridectomy, or if the condition of the globe before and after incision, as regards tension, is such that we have reason to fear excessive bleeding from excision of a portion of iris, it will be well at this stage to open the capsule carefully in its central and lower segments, a proceeding very much facilitated by the small size of the wound, the safety with which the globe may be manipulated, and a previously dilated pupil. If the cornea remains firm, if the lens is readily loosened on incision of the capsule, if the patient is perfectly quiescent, shows no tendency to vomit, and other circumstances prove favourable, we may extract without iridectomy, in which case it will be simply necessary to enlarge the wound in the manner hereafter to be described.*

If, from the nature of the case, we have decided on associating an iridectomy with the extraction, and desire to derive the advantages of an iridectomy, so far as tension is concerned, the iris forceps should now be introduced into the wound, the blades opened, and the iris seized near to its pupillary border, drawn out, and divided

* In some patients it is hardly worth while to run the increased risk which must always attend the attempt to save a portion of iris. Their facial confirmation and usual position of their upper lids is such as to completely conceal a coloboma made directly upwards, and it is in these cases neither a cosmetic defect or disability, so far as vision is concerned. In some, too (about 1 in 3) the danger of inflammatory mischief is so great that the bruising occasioned by the exit of the lens will almost necessarily end in adhesions, and consequent greater mischief and deformity than would be occasioned by a simple iridectomy directly upwards. When, however, this inflammatory or other contra-iudication does not exist, and the patients have prominent globes, we must not hold the iris too cheap, but remember that it plays a most important part in regulating the amount of light admitted to the eye, corrects the aberration occasioned by sphericity of the cornea, diminishes irregular circles of diffusion, contributes to the clearness of eccentric vision, and no doubt, after extraction in such cases, compensates largely for the absence of the lens.

at the right hand angle of the incision, carried over and excised at the left as in iridectomy for glaucoma. If, however, tension is quite normal, and the removal of a portion of iris is not likely to have a favourable influence on the after-progress of the case, a very small incision, or the merest slit in the constrictor fibres of the iris, will suffice to reduce the risk from bruising to a minimum, and still to some extent preserve the advantages of a natural pupil. If we have not found it necessary to open the capsule prior to iridectomy, it should now be rendered tense and carefully incised with the ordinary cystotome, the stem of which it is as well to have made either of platinum or soft steel, so that it may be bent in accordance with the projection of the patient's brow, or relative position of the eyeball. Having opened the capsule, and slightly loosened the lens, the eye should be seized to the right of the globe with a pair of ordinary forceps, and the wound enlarged to the left with the blunt-pointed knife (encroaching slightly upon the sclerotic) to an extent that experience tells us will, with a similar wound to the right, suffice for the ready exit of the lens; fixing the eye then with the left hand, the process must be repeated to the right. The incision is thus localized in a definite line, and its extent at any period of the operation is only limited by the will of the operator.

If the iris has been left intact, a comparatively large flap will be required, but if iridectomy has either preceded or is associated with the extraction, a very small shallow flap will suffice, one which yields readily to the advancing lens, while it is sufficiently slit-like and elastic to close without artificial apposition or external support, strong enough to resist protrusion by advancing vitreous, and too resilient to permit of accidental reflection.

The lens may now be extruded by slight pressure upon the globe, without passing any instrument into the eye, cortical fragments removed with ease, and any portion of capsule or lens matter likely to obstruct vision, be either

torn across or removed with the sharp hook, canula forceps, or sucker.

If, from the existence of firm adhesions, the lens cannot be started by pressure, it should be dipped out with the wire-loop spoon, an instrument which from its extreme tenuity assists the exit of the cataract without adding to its bulk.*

If it is desirable to extract by the lower section, the same form of incision may be employed, and this is preferable in a few cases where the lens is superficially softened, as any pulpy cortical matter left behind in the eye will gravitate to the bottom of the anterior chamber, pass harmlessly through the coloboma iridis, and either undergo absorption, or be washed out with the aqueous. The risk of its lodging behind the lower segment of iris and setting up subsequent irritation is thus avoided, but the section is less sheltered, and the coloboma uglier and more disturbing to vision.

The operation completed, I apply a drop of solution of atropine in the corner of the eye, and cover the lids with a pad of fine cotton wool, dipped in, but not saturated with cold water. If sodden, the pad is heavy, irregular, unmanageable; but just moistened on the surface, it fits accurately into the orbital cavity, and speedily dries into a smooth film, closely bedded to the surface of the lids, absorbing moisture, insuring equable support, a regular temperature, and the exclusion of light. It must be secured *in situ*, with gentle pressure, by thin strips of soap plaister, spread on unglazed calico (which adheres without warming). I find this by far the best dressing. Pressure can be accurately applied by strips fixed to the forehead and cheek, and, if necessary, by an additional broad strap passed from temple to temple. Any kind of compress bandage may also, if required, be readily applied over the pads and plaister. Inflammatory or other complications coming on after the operation must be treated on general

* Made for me by Coxeter.

principles, such, however, very seldom occur; rest on the couch for 48 hours in a partially darkened room, and confinement for a week, being, as a rule, all the after-treatment required.

In judging of a *résumé* of cases treated by this method, it is important to remember that they have not been selected in any way. That I have never refused a case, and indeed with a view of testing the method in question, have operated on several that in the opinion of their medical attendants and others presented little or no chance of a successful issue.

The cases operated on since November, 1865, are 91 in number, of these 10 were over 80 years of age, one being 88, and 18, 70 or over that age. Of this number the flap suppurated in three cases only. In 88 the wound healed, and the patients made good recoveries, with the exception of one poor woman, æt. 82, subject to severe attacks of epilepsy, who died in a fit 36 hours after the operation, in which case we found on post-mortem examination the wound healed, and the result of the operation so far as we could judge very good. Some of these patients are suffering from the effect of pre-existing amaurosis, others from remnants of capsule or partially closed pupils, which will admit of remedy by further operative interference, but the majority have already recovered excellent sight. I have reported a number of these cases in detail in the "Edinburgh Medical Journal," and shall complete the list so soon as a fair record of the optical results in 100 cases can be obtained.

Of the three cases in which the eye suppurated, one, an exceedingly feeble nervous woman, had been discharged as unfit for operation after a four months' stay in an ophthalmic ward elsewhere. This poor patient was quite blind, and fearing that I might refuse to operate upon her, concealed from me the fact that she was suffering from a severe attack of diarrhœa. The operation was completed without mis-adventure, but the diarrhœa became aggra-

vated, the patient delirious, and there was not the slightest attempt at healing, in spite of compress bandages and aromatic poultices, from first to last. Another aged female was in a similar feeble condition, and the case had a like unfavourable termination. The third, also a female, was 86 years of age, had been blind from calcareous degenerate cataract for 12 years, and had suffered from repeated attacks of irido-choroiditis, with the usual result of adherent pupils.

The palpebral apertures were exactly $\frac{5}{8}$ of an inch in length, and the eyes proportionately small. The lens was extracted with the loss of a few drops of vitreous, and I had hopes the case would do well, but vomiting came on, and, contrary to orders, the friends during my absence took her up a steep flight of stairs; this caused increased loss of vitreous, one of the choroidal vessels gave way, and on my return, I found blood trickling down the cheek. Suppuration followed, and singular to relate, both the eye operated on and its fellow wasted, the latter being considerably the most painful of the two.

I think I have said enough to prove that the operation in question has claims upon your serious consideration. It remains now for me to point out certain advantages of this method which might otherwise be overlooked.

In adopting it, the operator may use the right hand for either eye, so that there is no necessity for ambi-dexterity, and no risk of that increased fatality, which, from the greater difficulties of execution, has hitherto attended operations on the left eye. Up to the last moment, or indeed until success is almost certain, we are not committed to any special form of operation; it is in our power, in the interest of the patient, and with perfect safety, to delay, abandon, or modify the operation, as the exigencies of the moment may demand, or unforeseen circumstances require. With an incision three lines only in extent, we are in a position to handle the globe with impunity, while, should any accident occur, such as rupture of the hyaloid,

prolapse of vitreous, recession of the cataract, hæmorrhage into the anterior chamber, vomiting or other alarming symptom from chloroform, we may meet these complications with the utmost calmness and deliberation, knowing that the safety of the patient is secured. The protruding vitreous may be clipped off, a suture may be applied, blood sucked out of the chamber, the wound slightly enlarged, or the lens dipped out with the wire spoon; or what is sometimes better, we may safely delay the extraction by making the iridectomy a preliminary rather than a part of the operation;* and, utilising the experience we have gained of the patient's peculiarities, the state of the eyeball and condition of the lens to the benefit of both patient and operator when extracting some six weeks later. Should, on the contrary, all go well, we may aim at the maximum of success, and enlarge the wound sufficiently to permit the exit of the lens without an iridectomy, and this, the wound being localized with such extreme precision, and well back in the corneo-sclerotic junction, may be accomplished with an incision decidedly smaller than the one required in the old flap operation. It is easy to see whether the section is large enough, if the lens is previously loosened, and we may thus in some cases attain, either with or without the aid of the wire spoon, that highest indication of success,—a central and moveable pupil. Short of this also, we may make the iridectomy a mere slit or simple division of the constrictor fibres of the pupil, leaving the ciliary margin untouched, sufficient to permit of the exit of the lens with a minimum amount of bruising, and thus preserve, though to a less degree, the advantages of a natural pupil. If, in the extraction, without iridectomy, the iris should prolapse, the comparatively small size of the wound, and the greater firmness of the flap will

* Certainly, when iridectomy is performed at the same time as the extraction, the occurrence of secondary cataract is more common than in the flap method; it is difficult to say why, but it is probably owing to exudation from the recently cut edges of iris.

permit of our safely replacing it, as well as of coaxing out any cortical débris that may have floated into the pupillary space. It will thus be seen that the greater portion of the operation is completed with a wound so small, that the occurrence of any accident, so far from finding the operator, as in the old flap method, utterly powerless, need not cause either danger, embarrassment, or delay. By performing the iridectomy and laceration of the capsule through a wound only three lines in extent, we preserve the effect of atropine upon the pupil, if not fully, at least to a great extent, and facility of manipulation with an enlarged pupil renders laceration of the capsule a matter of great ease and certainty, and not a mere flourish, to which the difficulties and danger attending the flap method have frequently reduced this portion of the operation.

In the old method, when the aqueous is gone, the cornea wrinkled, and the eyeball collapsed, it is difficult, especially in some lights, such as we are often obliged to put up with in operating, to see the exact position of parts. The complete evacuation of the aqueous occasioned by the large size of the wound, and the irritation of the iris causes the pupil to contract, it would not be safe to render the capsule tense, and its efficient laceration, which would afford so much facility for the subsequent removal of the lens, becomes a matter of difficulty and danger when the tissues are collapsed, and offer no resistance to the pricker. With a three-line incision, on the contrary, such as I have described, the relative position of parts is much better preserved. The aqueous is not so completely evacuated, irritation of the iris is not so great as to cause more than partial contraction of the previously dilated pupil. Wrinkling of the cornea does not obscure the operator's vision, and the capsule is consequently safely, and much more easily rendered tense, and incised to the requisite extent.

Of course the greatest advantage is the greater

certainty of success, and (especially in old people) the slight after-treatment required. It is necessary in infirmary practice to operate upon so many worn-out marasmic individuals, that a fortunate issue in a majority of such patients must plead strongly in favour of any method that has been successfully adopted in like cases.

Since the above was written, I have operated upon 14 cases, making the sum total 105; and I have no further failures to report. In many of the cases the lens was extracted from both eyes at one seance, and a large proportion of the patients were very unfavourable subjects for operation; I may also mention that I never now notice the repeated gushes of aqueous humour subsequent to the extraction, which may be taken as a proof that the wound heals with rapidity, and that the total absence of pain during the operation or afterwards, and the very slight inconvenience occasioned has been most gratifying throughout.

RECURRENT FIBROID TUMOUR OF ORBIT; REMOVAL; REAPPEARANCE OF THE DISEASE IN THE HARD PALATE; EXCISION OF UPPER MAXILLA; RECOVERY.

By George Lawson, F.R.C.S.,

Surgeon to the Royal London Ophthalmic Hospital, Moorfields; and Assistant-Surgeon to the Middlesex Hospital.

The peculiarity in this case is the remarkable tendency which the patient exhibited for the formation of fibroid growths. They did not recur in the site from which they had been removed, as such tumours most frequently do, but on each occasion they reappeared in a different locality. In the first instance, the growth sprang from a small spot of the periosteum of the orbit, from which it was so completely excised that it has not since recurred. It next appeared in the hard palate of the left upper maxilla, when it was again effectually removed; and lastly it returned in the hard palate of the right side when another operation was performed, and the bone, with the periosteum from which it sprouted, were entirely gouged away. In each instance the tumour sprang from the periosteum of the bone, with which it was inseparably connected. The details of the case are as follows:—

In May, 1866, a lady, æt. 32, came under my care on account of a tumour in the left orbit.

History.—She stated that it had been growing, she thought, about six years. It appeared first as a small firm mass at the upper part of the outer wall of the orbit, and could be felt through the upper lid. As it grew, it extended itself into the upper eyelid, stretching it downwards over the eye, and pushing the globe inwards, towards the nose. When I first saw the patient there was a tumour in the upper eyelid, about the size of a small horse-

chesnut, which could be traced backwards into the outer part of the orbit. It had drawn the outer half of the lid completely over the eye, and dragged it, by its weight and bulk, to below the lower lid.

The globe was forced inwards by the growth, and could not be everted to the mesial line of the orbit. The tumour was firm, and so elastic as to give the impression of fluid.

Operation.—The outer canthus was divided, and the upper lid turned up, so as freely to expose its conjunctival surface, through which an incision was then made on to the tumour. With a little dissection the growth was traced to the outer wall of the orbit, from the periosteum of which it had sprung. After it was removed, the lid was replaced, and a single stitch closed the cut edges of the outer canthus.

The patient recovered, without a bad symptom; the eye gradually regained its power of eversion, and the lid, which had been much stretched, shrunk to its proper dimensions.

On examination, the tumour was found to be recurrent fibroid. It was enclosed in a delicate capsule, which isolated it from the structures in which it lay.

In March, 1867, the patient again came under my notice. The eye and eyelid had completely recovered from all effects of the operation. It was for a tumour in the left upper jaw for which she now sought relief.

About four or five months previously, a small swelling appeared in the upper part of the hard palate, on the left side. This rapidly increased, spreading backwards into the soft palate, and forwards, so as to press upon the incisor teeth. The swelling was so soft and elastic that it conveyed the impression of fluid, and had been punctured. At the time of my seeing her, a solid growth occupied the left hard palate, and included also a portion of the soft palate. It was irregular in outline, but with a perfectly smooth surface.

As the disease was increasing, and had already encroached on the mesial line of the palate, it was necessary to remove it. This I did by first making a central incision through the lip, and then drawing an incisor tooth. I excised, with a fine saw and bone forceps, the whole of the left hard palate with the alveolus, and cut away with a bistoury as much of the soft palate as was involved in the disease. The tumour was of a similar structure to

that which I had previously removed from the orbit. From this operation the patient made a rapid recovery.

In October of the same year, the patient again came under my care. The disease had recurred, and shown itself in the hard palate of the right upper maxilla, opposite to the first and second molar teeth. There was also a fibroid tumour in the parotid region, which had been present some years, but had now begun to increase in size. I decided at once to remove the disease from the palate, and this I did with a gouge, freely scooping away the surface of bone with the periosteum from which it grew. I also dissected out the tumour over the parotid, which was of the same nature as the disease elsewhere.

February 9, 1869. There has since been no recurrence of the disease.

A MODIFIED OPERATION FOR CLOSED PUPIL AFTER REMOVAL OF CATARACT.

By Henry D. Noyes, M.D., of New York,

Surgeon to New York Eye and Ear Infirmary.

When severe or protracted inflammation has followed the removal of cataract, and good perception of light remains, the hope of recovering sight depends on the possibility of making a permanent opening through the dense membrane which often occupies the lenticular fossa.

This membrane is found upon the iris as a framework, and consists chiefly of new connective tissue re-inforcing both iris and capsule. It often acquires a toughness which defies the grasp of iris forceps, and renders the usual method of iridectomy unavailing. It is often highly vascular, and the flow of blood into the anterior chamber soon compels the operator to desist.

Iridotomy, that is, a simple incision through the diaphragm, may sometimes succeed, but the aperture is very liable to close.

Another operation, devised by Dr. Agnew, of New York, will sometimes overcome the difficulty. A broad needle is pushed through the cornea and membrane, at the distance of a line from the limbus; while this is held in position, a wound is made at the opposite side of the cornea, through which a small hook is introduced and caught in the hole made by the needle in the secondary cataract. In pulling out the hook this hole is enlarged, and perhaps a portion of tissue brought through the corneal wound. The purpose of the needle is two-fold: first, to make an opening through the membrane; second, to offer sufficient resistance in tearing it.

The second indication of the needle is of great importance; without it either a dialysis at the ciliary ring may occur, or the drag of the hook pulls so hard on the sclera

as to cause it to be deeply indented, and the membrane will not yield.

But the help of the stop-needle is not always sufficient to tear a hole in this membrane. I have been foiled in the attempt, and therefore compelled to devise another method.

It is as follows:—The instruments needed are a stop spring speculum, fixation forceps, a rather broad Graefe's extraction knife, two small hooks, and a pair of scissors. It is better to give an anæsthetic. The Graefe's knife is entered at the outer margin of the cornea, and carried completely across in the horizontal meridian, until it emerges at a corresponding point on the opposite side; the wound of counter-puncture must be as large as that of entrance.

The knife is partially withdrawn, and when its point comes opposite the middle of the iris, it is plunged backwards through the diaphragm into the vitreous. In doing this the handle is raised from the horizontal to an oblique position, and by the escape of aqueous at the inner wound the iris comes forward to meet the point of the knife. The wound in the diaphragm should be made as large as possible. When this has been done the knife is quickly withdrawn before all the aqueous humour shall have escaped.

Immediately, before bleeding becomes profuse, a hook is passed through each corneal wound. The operator holds one in each hand. The hooks are blunt at the point, have rather an open curve, are very slender, and made of soft metal, so that the shank may be bent to any angle; the shank is about an inch long.

The hook which enters at the inner corneal wound must have a bend at the middle of the shank to nearly a right angle. This hook it is better to put in first, then put in the hook at the outer wound. The points of both hooks are now to be caught in the wound made through the middle of the iris and traction to be made in opposite

directions. The effort must be, to drag out a portion of tissue at each corneal wound, and if any can be pulled through, it must be cut off, and thus the hooks are liberated. If none can be brought out, the hook must be disengaged when it comes to the corneal wound.

The manipulation of the hooks requires tact and delicacy; to rotate the bent hook so that it shall first enter flatwise, and then be turned to catch in the iris, is a little troublesome. When both hooks are fairly caught in the iris, any needful degree of force may be used upon the membrane without danger of doing mischief. The force is expended exclusively upon the membrane to be torn, and inasmuch as one hook pulls against the other, the available amount of force is much greater than can be safely employed by any other mode of operating.

I have yet to find a secondary cataract as tough as not to yield an opening to this persuasion. The pupil thus made is central and abundantly large. It is better to make it large, because there will be ultimately a slight reduction of its size as the corrugated sides of the membrane stretch out.

I have applied this method to three cases, and in all have felt satisfied that a less efficient proceeding would not have secured success.

The degree of reaction after the operation has been moderate, and the eye has been considered well in 10 days, or two weeks.

Case of Extraction of Cataract and subsequent Operation.

The following case, in which the operation above described was resorted to, possesses features which induce me to relate it in detail:—

Colonel G. F. T., civil engineer, æt. 61, in robust health, accustomed to exposure, had dimness of sight for 6 or 7 years, during which time he enjoyed the attentions of a person calling himself "oculist," who pronounced his case retinitis. The patient found mydriatics improve his sight, and had become accustomed

to use atropine. He used a very dilute solution which he prepared, and also resorted to a perforated diaphragm which he had learned aided his sight in drawing, reading, &c.

A proper examination showed that he had imperfect cataract in both eyes; the striæ pretty equally diffused through the lenses. His pupils were naturally small. I used a solution of atropia, gr. ij ad ʒj, to make ophthalmoscopic examination, and was annoyed to find the next day that it had excited a smart conjunctivitis and erythema of the cheek and of the lids. The patient told me he was used to this, that such was always the effect of atropia, and he used a dilute solution of iodine to control it. In a few days the attack passed away.

I had no doubt from his history that cataract had existed for many years, and was making slow progress. The loss of sight was now so great that he could no longer read, and it became a serious question what to do. As the development of opacity was so slow, I determined to perform keratonyxis, and at the same time make an iridectomy upwards.

This was done satisfactorily, and for a week no unpleasant consequences followed. I was induced to do iridectomy because I was afraid to use atropia, and hoped thus to avoid iritis, while by the needle the lens should be fitted for speedy removal. After a week inflammation ensued in the form of irido-phakitis, and this intensified until cyclitis threatened, and that of a purulent type. The eye was very tender, tense, painful, and perception of light growing feeble.

In consultation with Dr. Agnew, I decided that extraction of the lens was imperative. This was done by a section at the lower edge of the cornea with iridectomy. The operation at the upper part of the cornea would have been excessively difficult, because the eye was deep, and the palpebral opening small. It was necessary to use the spoon in getting out a portion of the lens.

Immediately after the operation the eye became better, and now it was desired to use a mydriatic. Daturine was almost as irritating as atropia, and finally a solution of hyosciamine gr. iv ad ʒj was found to be tolerated. The employment of extract of Belladonna to the forehead caused erythema as readily as atropia in the eye. Gradually, under applications of cold water and the

bandage, the inflammation abated and the eye appeared healthy. The pupil was almost completely closed, a minute opening remained covered by semi-transparent capsule. Though this patient could count fingers at 1 foot.

Two months after the eye had regained its normal state the pupil was opened by two hooks in the manner above described. The result was vision $\frac{2}{3}$ with + 4.

My inferences in the above case are, that rather than resort to keratonyxis to complete the opacity of an immature senile cataract, it is better to do modified linear extraction. I have acted on this conviction in two cases since the above operation, and with good result.

When severe inflammation has been set up by keratonyxis, removal of the lens is the proper treatment.

The irritating effect of atropia on the conjunctiva and skin is to be looked upon as an idiosyncracy of the individual. If daturine cannot be tolerated, hyoscyamine may answer.

COLOUR BLINDNESS, AN EFFECT OF NEURITIS.

By J. J. Chisholm, M.D., Charleston, S.C. (U. S. A.)

Mrs. C., æt. 35, heretofore enjoying always perfect health, was attacked July, 1865, with typhus fever, and only recovered after a very severe struggle. When convalescence had set in, she gained flesh rapidly, and in a couple of months, from the day of attack, she weighed more than she had ever done. One month from the establishment of convalescence, on going to bed, she perceived a numbness in the soles of her feet, which progressed upwards, and by morning she had lost sensation in her lower extremities. During that day a mist or haziness came over the right eye, unaccompanied at first by any uneasiness. With the increasing haziness pain came on accompanied by some injection of the conjunctiva. She suffered intensely for some hours with pain in the eyeball, and as this subsided, this eye was left, in about 36 hours from the earliest symptom, totally blind. Similar phenomena then made their appearance in the left eye, and running through the same phases, culminated in 36 hours in the destruction of sight in it. In 3 days from the commencement of this attack she was left in utter darkness. With the exception of an unusual dilatation of both pupils, the eyes were to all appearances perfectly natural. This condition of total blindness continued for two weeks, after which time the perception of strong light returned, and in a few months she could with either eye distinguish large objects at a short distance.

She first came under my observation February, 1866. She could not then read No. 20 Jaeger test-types. At this time the deadened sensation of the legs and feet had not altogether passed off, although her thighs and even legs were quite sensitive. Both pupils were still unnaturally dilated. Strychnia and iron with bark were prescribed and taken for several weeks with decided benefit.

The patient was again examined in November, 1866. With effort she can now read brilliant (No. 1 Jaeger test-types) with either eye. Her distant vision for small objects is very unsatisfactory. In looking at the carpet upon the floor she can only discern the pattern immediately around the spot upon which she

is standing. Six feet off it can only be made out by staring intently for some little time. With this effort she can discern even small objects. The most interesting connection in the case is the defect in detecting colour, achromatopsia. For a long time her vision was achromatic. Even when small objects could be clearly defined, she could distinguish colours only as either white and black, or shades of grey. The restoration to chromatic vision showed itself in a slowly growing perception of blue shades. After some months the shades of yellow could be perceived. Reds cannot yet be detected. All the shades of red appear brown.

In both eyes there is still moderate dilatation of the pupils with torpidity in iritic movements. Also a prominence of both globes. At no time has there been any interference in the movement of either eye. The first ophthalmoscopic examination gave a shaded outline to the disc. The second examination, after an interval of six months, exhibited a clearly defined disc of decided palor—atrophy to a certain extent.

Acuteness of hearing has been restored with perfect sensibility in the lower extremities. During the attack there were no other cerebral symptoms than those indicated.

Colour blindness as a pathological condition is so rarely met with, that all cases throwing any light upon this curious condition should be recorded. From these reported facts, when they become sufficiently numerous, physiological principles of great interest may be deduced for the solution of the problem, viz., whether there are special nerve fibres, for the recognition of special colours, independent of those used in the clear definition of objects. In the above interesting case the disease evidently commenced with intra-cranial troubles, as evidenced by defective hearing and loss of sensibility in the lower extremities. *Pari passu* with the slow removal of the proximate cause, was the gradual restoration of the oppressed functions. Progressive and permanent achromatopsia has been noted as accompanying progressive atrophy. The restoration (even partial) of chromatic vision when lost in affections of the optic nerve, is seldom observed.

NOTES OF MISCELLANEOUS CASES.

By Jonathan Hutchinson, F.R.C.S.

(Continued from page 154.)

No. XXXV.—*Double Glaucoma in middle life after Erysipelas of the face, and with the history of violent attacks of Facial Neuralgia.*

In the following note I confine my attention to the history of the antecedents of the glaucoma. In our fourth volume I recorded some cases in which severe neuralgia had preceded the occurrence of glaucomatous changes in the eyes. Professor Horner has since taken up the same point, and has given other cases, whilst a series of important experiments have been instituted by Professor Wegner. Of the latter we have already given an account. The evidence in favour of the nerve-origin of glaucoma seems increasing on all hands. Iridectomy is possibly chiefly efficient as a species of neurotomy. Whether vascular changes are the next stage in the process or whether we may not, without absurdity, suspect a condition of tonic spasm in the sclerotic, is a matter about which I feel much doubt. At any rate cases illustrating the antecedents of this curious disease are valuable, and as such I record the following:—

Mrs. Crockett, æt. 34, in girlhood had weak sight, probably hypermetropia. She had occasionally used glasses. Admitted April 28th, 1868.

Last Christmas she was attacked by erysipelas of the face; her eyelids were quite closed. She was five weeks in bed, and altogether ten weeks ill. When she recovered she found her sight very dim, and during the next few weeks it steadily failed. She has not seen to read since her illness. Both eyes, but the left especially, have been sore and tender, but she has not had any violent pain in them. She has often suffered from

neuralgia in her face, and especially during her recovery from erysipelas. She had been ailing some months before the erysipelas.

Both globes are hard, the left being the harder one. In both the cornea is steamy and inspection difficult. In both, however, the disc may be seen to be cupped, and in the left there is very active arterial pulsation. The disc is not in either eye pale to any considerable degree. In both eyes the pupil is dilated and quite motionless and oval, with the long axis horizontal. She can just at 12″ read No. 20 with either eye. The left, the harder one, sees rather more sharply than the other.

Her attacks of neuralgia appear to have been definite and very severe. She says the pain would affect the whole of one-half of the face, and especially the side of the nose. It was generally the left side, but sometimes the right, never however being so severe on the right as on the left. She is very liable to colds. "The least thing will give me cold."

No. XXXVI.—*Paralysis of one Third Nerve in an Infant, with partial Hemiplegia—History suspicious of Inherited Syphilis.*

William H. Lemude, æt. 3 years and 10 months, was brought to the Ophthalmic Hospital on March 2nd, on account of his right eye. He had ptosis, divergent strabismus, and dilated pupil. The other eye was not in any way affected. The right third nerve appeared to be implicated in all its branches, but in none of them to a state of complete paralysis, thus the ptosis was not absolute, and the pupil, although twice the size of the other, acted somewhat on exposure to light.

The history was that the eye symptoms had followed an attack of measles eighteen months ago. Before this he had had several other illnesses. During the measles he was very ill, and several times his mother thought him dead. He never had any fit. When he recovered "he was a mere skeleton," and his mother found that he was weak in his left limbs, and that his right eyelid drooped. Before this he had been able to walk, but he has not done so since.

His left limbs are still weak and somewhat atrophied. He never used the arm, and the fingers are kept fixed in the palm. It is much thinner than the other arm.

In early infancy symptoms had occurred very suspiciously like those of hereditary syphilis, but not conclusively so. I thought it wise, however, to adapt my treatment to this probability.

Paralysis of any of the ocular nerves is of such infrequent occurrence in childhood, that I have thought this case worth recording, notwithstanding the obscurity of the diagnosis.

No. XXXVII.—*Very profuse Hæmatemesis—Attack of severe general Spasms three days later, followed by failure of Sight—No Ocular changes—Report of the state one year later.*

Mrs. G., æt. about 48, of Esher, Surrey, was sent to me by Dr. Peacock on March 22nd, 1866. She could see only the largest capitals. The pupils were of normal and equal size, but sluggish, they dilated well with atropine, and on examination with the ophthalmoscope, I could detect nothing in explanation of her loss of sight. She was pale and nervous, but not extremely weak. Dr. Peacock informed me that she had no cardiac disease nor any morbid condition of the urine. Through life she had enjoyed excellent sight, and the history of the illness which had led to her amaurosis was the following:—On Monday, January 16th, she was attacked by profuse hæmatemesis. The vomiting of blood continued to recur until Wednesday, and was extremely profuse, so much so that her death was expected. Dr. Peacock was summoned in consultation with her usual medical attendant, and the diagnosis of gastric ulcer and arterial hæmorrhage was given. During Thursday she remained extremely feeble and perfectly blanched from loss of blood. On Friday in the evening she had an attack of general spasms and cramp, which caused most severe pain, and affected all her limbs. On recovering from this she found for the first time that her sight was dim. On Saturday her sight was much worse, and during the next few days it failed so rapidly that at the end of a week she was in the condition noted above, able only to see large capitals. Mrs. G. herself attributed the attack of cramp to a night draught which had been given her, and she described symptoms very like those which strychnia might have produced, but she told me that her medical attendant had assured her that the draught did not contain anything which could have caused the attack. (She still,

however, retains a strong opinion on this point.) During the month which intervened between the failure of her sight and the date of her visit to me, she had gradually improved in health, but gained nothing as regards her sight. I prescribed small doses of nux vomica with iron, but did not see her again for nearly a year.

On January 31st, 1867, Mrs. G. again consulted me. Her sight had remained much as it was, or had perhaps got a little worse. She could only make out single letters of Snellen No. 70 at 12″. The pupils were small. I used atropine, and again examined with the ophthalmoscope. The discs were rather pale, but not remarkably so. The veins were of normal size, but the branches of the arteria centralis were all of them very much diminished in size. The two eyes were exactly alike, both as to vision and objective appearances. There was no cupping of the disc, nor any disease of retina or choroid.

Mrs. G. still suffers from dyspeptic symptoms and severe headaches, but is otherwise in tolerable health. She has had no further losses of blood. It should be stated that prior to the attack after which her sight failed she had twice suffered from hæmatemesis, first at the age of 18, and subsequently when 26. She has not menstruated for several years past.

No. XXXVIII.—*Sudden Attack of Acute Febrile Symptoms in a previously healthy infant—Inflammation of both Eyes—Abscess in the Hip—Pyæmia?—Recovery.*

George Jones, an infant of 18 months, was brought to the Hospital on November 3rd, 1867. His left eyeball had suppurated and collapsed, and the right was the seat of a large perforating ulcer of the cornea. The history was that he had been a healthy child until a few weeks ago, when he was attacked by an "inward fever," after which his eyes inflamed. He had at the same time an abscess on one hip. He had been very ill, but at the time of his application at the Hospital was already gaining in general health.

The occurrence of abscess suggests the probable occurrence of some blood disease allied to pyæmia.

No. XXXIX.—*Acute Ophthalmia, with Diphtheritic Pellicle on the Conjunctiva—Entire Destruction of both Cornea.*

The following case clearly belongs to a very different category to the preceding one. The ophthalmia appeared to be local, and was not preceded by febrile symptoms. It was of the "diphtheritic" type, if that term is to be applied to inflammations, mucous membranes having exudations of coherent lymph.

Frank Webb, an infant æt. 14 months, was brought to the Ophthalmic Hospital two months after the outset of his disease, and when both eyes were lost. In each eye the cornea was destroyed by ulceration and sloughing, and the iris prolapsed. He was a stout child, and had been well cared for. He had been brought up by hand. He had not had any illness. The statement was that both eyes had very suddenly inflamed. In one night "the eyelids of both had swelled up as large as walnuts." There did not appear to have ever been any profuse purulent discharge. I found the lids lined with dense coherent pellicles of lymph, which were with difficulty detached from the conjunctiva, to which they adhered.

As there was clearly nothing to be done for restoration of sight, I allowed the child to return home to a village in Cambridgeshire, with a chloride of zinc lotion, to be used until the remains of the inflammation had subsided. No diphtheria was known to have occurred in the village.

No. XL.—*White Atrophy of Optic Nerves (Neuritis?) in association with general Arthritis (Spinal?)—Vesicles on the Cornea.*

The following case interests me in reference to the connection between nerve lesions and rheumatoid changes in joints. I have long believed that there are forms of "*spinal* rheumatism" in which the pain and nutritional changes in the joints are induced by derangements beginning in the spinal cord. The same inference seems recently to have been made by several independent observers, and some important facts have been published illustrating the joint-changes which occur in loco-motor ataxy. Ophthalmoscopists will probably have good oppor-

tunities for helping in the discussion, as they already have done in so many other directions in connection with diseases of the nervous system.

Mr. Rait, æt. nearly 80, has been almost blind for a year past. Both optic discs are uniformly grey white, and in both the arteria centralis is so much diminished that it is only just to be discovered. The margins of the disc are in most parts abruptly defined, but here and there a little jagged. Thus we have but little evidence from the state of the discs as to whether their present atrophy is due to neuritis or is primary. The history, however, favours the suspicion of neuritis. He tells us that about eighteen months ago his eyes failed suddenly. Up to that time he could read well, and he attributes his failure to his having engaged in hard reading of Colenso's books. The failure was so rapid that in a week he could scarcely see capitals. During the next few months he got steadily worse. At present he cannot count fingers. It appears, on cross-questioning, that this attack was not his first. The right eye had indeed been very defective for many years before, and a few years ago, when at Bath, he had a temporary blindness of the left, from which in a week or two he recovered.

At no time has he suffered from cerebral symptoms, other than those shewn by his eyes, never headache or sickness. He never smoked, and has always been temperate in eating and drinking.

He came to the Hospital, not on account of his amaurosis, but because his left eye "felt gritty." We found the left cornea covered with vesicles. In the course of a few days most of these had disappeared.

His arteries are not calcareous.

The subject of our case is a healthy looking florid old man. He was born in Shields, but came to London in boyhood. He was a tailor until he was 60, of very temperate habits, and in excellent health. From 60 to 70 he was engaged as a scripture reader, and "found no fault with himself," for "he could do anything." At about 70 he found his joints a little stiffening, and if he sat long could not get up easily. A little later than this he had "rheumatic fever," and was three months in bed. The joints, especially the knees, swelled much; he had not much pain in them, but curious nervous sensations in the legs, "as if one

leg were two." When he left his bed he used crutches, and after a while went to Bath. He has had no severe illness since that, but his upper extremities have gradually become implicated. At present both wrists, both elbows, and both shoulders are slightly swollen. There is puffy swelling external to the joints, and slight effusion within. All of them are somewhat stiffened, and he complains of pain on sudden motion. At other times he has no pain. All of them grate and crackle on movement, and I have no doubt that they are the seats of the changes of "chronic rheumatic arthritis." His lower extremities are much better than formerly, and he walks fairly. During the last year or two he has been much inconvenienced by obstinate constipation. His hands are puffy, and often get cold. He has no subjective sensations (pins and needles, &c.) in them. We may note that the smaller joints of the fingers, &c., are not stiffened. He appears to have good tactile sensibility. He can button his shirt, but, owing to the state of his wrists, he cannot feed himself. He has never had lumbago or sciatica. The vesications on his left cornea were attributed to the application of a very hot poultice, which was used on account of some pain in the eye, but very possibly they were there before the poultice, and caused the pain. They probably indicate a peculiar condition of the nutrition of the structure implicated.

No. XLI.—*Retinitis pigmentosa in an advanced stage—Gradual failure during* 20 *years or more—Nyctalopia not present—Reported failure of sight in a daughter of the patient.*

James Mold, æt. 60, from Ware, Herts, was brought to the Hospital in January, 1869. His eyes presented the more advanced changes met with in that form of choroido-retinitis, known as "retinitis pigmentosa." The changes were symmetrical.

In each eye the disc was pale yellow-grey ("waxy-looking"), all the smaller vessels had disappeared, and of the central ones only a single venous trunk upwards and one downwards could be traced. Immediately round the disc was a small area in which but little pigment was present. At the margin of this area pigment accumulations in dots and streaks began to be seen, and rapidly increased in the direction towards the meridian until the dots and patches almost became confluent. No-

where were any patches of absorbed choroid, and the similarity of the patches to bone corpuscles and canaliculi was very striking. The pigment accumulations could be easily ascertained to be in front of the choroidal vessels, but no retinal ones could be found by which to test the position in that structure. He could not see to count fingers. At the extreme periphery (ora serrata) the pigment diminished in quantity and almost ceased.

History.—The man was a healthy farm labourer. He said that fourteen years ago his sight had so far failed that he could not see to read. It had been failing very gradually for some time before. During the last year he had been obliged to give up work, and latterly had been an inmate of the workhouse. His account of the first stages of his disease was vague, and it seemed probable that it had been coming on long before he noticed it. He would not admit that he had ever experienced "night blindness." He could, he said, on the contrary, always see better in the dusk than in sunlight, and always very fairly by moonlight. He had often been annoyed by globes of light before his eyes and also by moving black specks, but latterly the muscæ had disappeared, whilst the photopsiæ remained.

He was a man of dark complexion, having black hair and grey eyes. He had never suffered from any form of ill health, excepting dyspepsia, never rheumatic. His father and mother were from distant parts of the country, and were not related before their marriage. He was not aware that any relatives had suffered from defect of sight. He had himself two children, a son and daughter. The latter, aged 30, complains of her sight.

This case was examined by several experienced ophthalmic surgeons, who declared that the quantity of pigment was in excess of anything they had seen before. I used my best endeavours to have the daughter brought to town for examination, but, as she was in ill health and at a great distance, I did not succeed. I ask especial attention to the fact of absence of nyctalopia, as a very unusual one.

No. XLII.—*Right eye Normal and the left Myopic—Syphilitic retinitis in the right and myopia then first discovered in the left—A similar condition, as regards refraction, in one of the patient's children.*

A woman, æt. about 30, came up from Derby with myopic glasses, No. 14, but with the complaint that one eye was much worse than the other. I found that she read brilliant with the left at about 10 inches, and that at no distance with the right could she see anything higher than 20 Jaeger. The left globe looked longer than the other.

January 15, 1869.—Both pupils dilated well with atropine. In the left eye the inverted image was readily seen at about 18″, and there was a crescent above the disc. The media and retina were perfectly clear. In the right eye the erect image was seen at 2″ to 3″. There were numerous small and indistinct flakes in the vitreous, and the retina in the neighbourhood of the disc was hazy.

On further questioning, I found that the patient had enjoyed good sight in early life, and until three years ago. She had only found glasses necessary two years ago. Four years ago she had suffered from "some disease from her husband." The account as to syphilis was not very positive. She had discharge and soreness for some time, and became hoarse, but did not notice any rash. It was, however, almost a year after this occurrence that she found her right eye fail. She had also since suffered much from nervousness, and had, she said, at times been almost out of her mind.

My diagnosis in this case was, that she had, congenitally, eyes of different refractive power—the right normal, the left myopic. That three years ago she had syphilitic inflammation of the vitreous and retina in the right, and that after this, for the first time, she was compelled to use her left, and then made the discovery that it needed glasses. Her statement that at one period her sight improved so much that she was able to read ordinary type, and that it afterwards relapsed, favoured this view. She told me further that her eldest boy could see well with one eye, and not with the other.

On a subsequent occasion she brought her boy to me. I

found him myopic in the right, an eighth, and with the left normal; both, however, having a degree of astigmatism. The right disc showed a pigmented crescent, which was wholly absent in the other.

No. XLIII.—*Sudden failure of Sight in an old Man without other Symptoms—Senile Rheumatism.*

A very healthy looking man, aged 78, came up from Harwich, on account of his sight. His history was an unusual one. His occupation for many years past had consisted in exhibiting a camera-obscura to visitors. He was, whilst thus engaged, in a dark room inspecting a white sheet, but never exposed to glare of light. He had enjoyed excellent sight through the whole of his life, until one day on leaving his camera, he suddenly found that he could not see. He had not had any symptoms of a fit, nor had he any material headache. The two eyes were equally affected. From that time to the date of his application at the Hospital, he had never been able to read. With + 16, I found that he could just read Jaeger 14. He thought that he had not got either better or worse since it first occurred. With the ophthalmoscope we found the discs both pale, and around the margin in each, was a circle of exposed sclerotic of irregular width, just like what is common in myopia. His globes, however, were not myopic. There was no evidence of neuritis.

Excepting that he suffered from senile rheumatism, the old man was in excellent health. He had had one testicle removed in early life on account of an injury, and was very proud of the fact that he had since been the father of six or seven children.

XLIV.—*Injury to the left Forehead in a fall, followed by immediate and complete Blindness of the left Eye, with defect of Smell on the same side.*

A gentleman, æt. 25, was brought to me by Mr. Savory, of Stoke Newington, on account of an injury to his head, which had resulted in the entire and immediate blindness of one eye. He had been pitched head foremost out of a dog-cart, and cut on his left forehead by a stone. He was stunned for a quarter of an hour or so, and then recovered, but found that he was quite blind in the left eye. On examination, I found that he

had lost all sense of smell in the left nostril. With the left eye he could not tell light from dark. There were no ophthalmoscopic changes. This was in August, 1867.

On January 18, 1869, I saw this patient again. His accident was in June, 1867, and he was first brought to me about six weeks after its occurrence. On questioning him again, I find that he recovered from the stunning in half an hour, but had very profuse bleeding from a small wound on his forehead. He was much weakened by this hæmorrhage, and kept his bed several days. The parts about the orbit were much swollen, and he had leeches applied. He never had any bleeding (as far as he knows) from his mouth or nose, and he had no deafness. From his first recovery from the effects of the fall to the present time, he has never been able to perceive light with the eye. When I first saw him he could not smell in the left nostril, but latterly he has regained that faculty.

To-day he appears in perfect health, and states that he is wholly free from any effects of his accident, excepting the loss of sight. I find his left pupil of normal size and active, whilst the other is exposed, but it dilates and remains motionless when the other is covered. The eye diverges a little when he looks at near objects, the divergence is not noticed when he looks into the distance. The media are clear; the optic disc is pale, and presents a shelving cup; there is a very conspicuous patch of pigment at its inner margin, which has nothing to correspond with it in the other eye. The vessels are somewhat smaller in size than in normal eyes, but not very much. The disc although decidedly pale, is not by any means so white as we often see it in cases of advanced atrophy.

It is exceedingly difficult to assign any plausible explanation for the loss of sight in this case.

If we suppose that the sphenoid bone was fractured, and the optic nerve torn across or violently stretched, we have the inexplicable absence of hæmorrhage from the nose, the rapid recovery, the absence of evidence of external fracture of the skull, which would probably have attended it, and the very slight character of the concussion symptoms. The defect in the sense of smell on the same side, which persisted for some months after the accident, certainly lends support to the hypothesis of fracture.

It may be suggested that the very profuse hæmorrhage from the frontal artery was the cause. Cases are recorded in which very free hæmatemesis has been followed by amaurosis, but I am not aware of any facts as to local losses affecting only one eye.

Then we have the possibility of injury to the frontal nerve causing impairment of sight, but against this is the fact that the impairment amounted to absolute extinction, and that from the very first, whereas such effects generally follow after an interval, and only become complete after considerable time.

That there was no material damage to the ophthalmic artery seems clear, for when I first saw him, the intra-ocular circulation seemed normal in every respect, and at the present time, although the small vessels have disappeared, the main trunks can be easily traced.

XLV.—*Loss of one Eye by Choroiditis, the other remaining perfect—Syphilis suspected.*

Mrs. W., aged 48, from Ipswich, attended on account of defective sight in the left eye. With the other she could see as well as ever.

We found the choroid disorganized around the optic disc over a large patch. The margins of the patch were very well defined, and extended on the outer side considerably past the yellow spot, and in other parts the choroidal epithelium was absorbed much more widely. At the principal parts of the fundus both choroid and retina appeared healthy. The disc was scarcely paler than natural, and the central artery and vein were almost of normal size. There were many large irregular blotches of pigment where the choroid was absorbed. The choroidal stroma was thinned at many parts, and at a few small spots the sclerotic showed though quite white. Thus the case differed from "choroiditis disseminata," in that there was but one very large patch.

The patient's history was chiefly negative. She was not known to have had syphilis. Her son had attended for a long time for very intractable inflammation of both corneæ with ulcers. It was not supposed to be syphilitic, but its course was peculiar and suspicious. Mrs. W.'s defect was believed to have com-

menced about a year ago. There had been at times a certain amount of pain in the eye, no photopsiæ, and scarcely any muscæ had been observed. Media clear, excepting some striæ in lens. She had borne seven children, of whom only three are living. No definite symptoms of syphilis in any of them.

Remarks.—I cannot help suspecting that this curious instance of unsymmetrical choroidal disease is reallyan example of syphilitic taint derived through conception. The keratitis from which her son suffered was very peculiar, and although neither his teeth nor his physiognomy are characteristic of inherited syphilis, they are suspicious. In the form of syphilitic taint which women obtain through conception, we often see single and ill-marked maladies produced, such, for instance, as patches of lupus on the skin, sores on the tongue, in the throat, &c. Another remarkable example of unsymmetrical choroiditis is now under my care. In it a woman has lost one eye, with most extensive choroidal changes, whilst the other is perfect. In her case syphilis is clearly the cause.

Part II.

A Periscope

OF

CONTEMPORARY OPHTHALMIC LITERATURE.

DR. WEGNER: EXPERIMENTAL RESEARCHES ON GLAUCOMA.*

(An abbreviated translation from the *Arch. für Ophth.*, xii. 2, p. 1.)

During the last few years, Professor Horner has observed four cases of neuralgia of the fifth nerve, accompanied by glaucoma simplex.

Case I. B. Ritzmann, 28 years old, has suffered, since her 20th year, from hysterical attacks, palpitations, and cough. In 1858, she had hæmoptysis; in 1859, typhus. In July, 1861, she was attacked in the left side of the forehead, in the eye and temple, by violent pain, which was increased by stooping. There appeared to be before the eye a light cloud, and colours around a flame. Prof. Horner's assistant found in September myopia, c. $\frac{1}{10}$, slight amblyopia of the left eye (No. 1 with difficulty at 3″), contraction of the visual field at the inner and upper side, and excavation of both dics.

She was examined again in January, 1862, after she had been suffering for 14 days from violent pain over the whole left side of the head and in the eye. The left globe was hard; the visual field was much contracted at its inner and upper sides

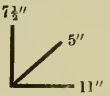
the media were quite clear; the disc was deeply excavated. She was tolerably stout; no organic change was found in the chest. The right eye was still healthy; there was, however, a central excavation of the disc. On the 27th January, a large iridectomy was made at the upper part; the pain in the eye imme-

* The editors are indebted to Mr. Thomas Windsor, of Manchester, for the following abstract of Wegner's able paper. It is to be considered as supplementary to a notice of the same paper which appeared in a former number, but from which the cases were omitted.

diately ceased, but the violent supra-orbital neuralgia continued. Next day she had only a feeling of pressure in the forehead; in the afternoon there came on much redness and increased temperature of the whole left side of the head; at 5 p.m. the pains were fearful, and continually increased for 1 or 2 hours.

The supra-orbital nerve was very sensitive to pressure, so also were the left infra-orbital and subcutaneous malæ. The eye continued free from pain, and the vision improved, but the pains in the forehead and temple persisted, notwithstanding quinine, and subcutaneous injections of morphia and atropine.

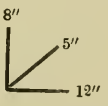
Suddenly, on the 24th March, the eye became painful, the vision worse (No. 2 with difficulty), without redness and without cloudiness of the media. She was now unfortunately obliged to leave Zürich, and was not again seen till the end of the year. The left supra-orbital region was very sensitive to pressure. Spontaneous pains occurred almost daily, and every afternoon there was much redness and heat of the left side of the face. The eyeball was no longer hard. The pupil was rather larger than on the right side. No. 2 Jaeger was read with difficulty, but correctly. The visual field was contracted on its inner and upper sides



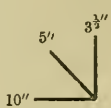
A seton, inserted on the 25th October, had no success; division of the supra-orbital nerve was followed by only a very temporary anæsthesia; the pains, which continued as severe as ever, were relieved by subcutaneous injections of morphia.

In January, 1863, the right eye also was attacked by acute pain.

(O. S.) M. $\frac{1}{10}$ S. $\frac{1}{4}$ Se



(O. D.) M. $\frac{1}{10}$ S. $\frac{3}{8}$ Se

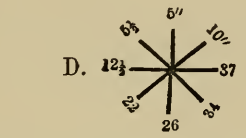


Right pupil not large, slightly movable; refracting media clear; discs excavated, the left much more than the right one. Subcutaneous injections, paracentesis of the anterior chamber without success; on the 23rd January a large piece of iris was excised from the upper part of the right eye. The pains immediately left the right eye, but continued in the left supra-orbital region. Violent pains in both eyes again recurred towards the beginning of February, during the menstrual period.

During the years 1863 and 1864 vision with the right eye was almost normal, although the field of vision remained contracted, the disc was not distinctly excavated up to its margin, and the eye was rarely painful; there was, however, often pain in the left eye, and supra-orbital region. With respect to the latter eye,

S deviated a little about $\frac{1}{4}$: the field continued contracted, and the excavation very distinct. A paracentesis was now and then made, when the pain in the left eye was very great (thus, on the 3rd June and 8th December, 1863); the effect of the puncture appeared to last longer than before the iridectomy.

The patient was again seen on the 23rd June, 1865. She stated that during the winter of 1864-65, she had suffered but little from pain, whilst during the last three or four weeks there had been violent exacerbations in the *right* eye. Present state: $M\frac{1}{1}$; (O.S). S = $\frac{1}{5}$; (O. D.) S = $\frac{1}{7}$; field of vision contracted especially inwards and upwards, though somewhat also inwards and downwards.



Eyeballs not hard, no congestion or cloudiness. Discs deeply excavated.

The pain in the right eye was much relieved by paracentesis.

Case II.—A woman, æt. 24, tolerably robust, was seen in August, 1860, for the first time by the author. She had suffered for many years from convulsions. The *left* eye had been very painful for some days, and the vision had become impaired; there had been no symptoms of inflammation. The pupil was somewhat large, the fundus was normal; with this eye she read No. 5 Jaeger with difficulty. Towards the end of October the eye became much worse; she had violent attacks of pain, followed by such impairment of sight that only No. 16 could be read; the visual field was contracted on every side, but specially from within and above. At this time she had an hysterical attack; for 24 hours she was half-asleep, spasmodically contracted the extremities, spoke sometimes connectedly and sometimes not. She was seen occasionally between January and June, 1861; the vision of the left eye varied between 15 and 19 Jaeger: the field was much contracted.

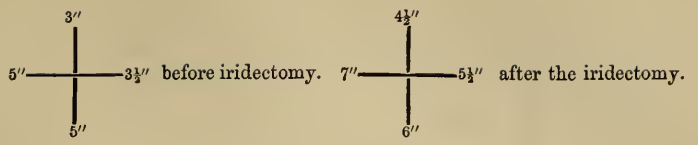
The pupil much dilated and fixed; the globe painful when

touched, never reddened. Right eye slightly hypermetropic; field of vision and pupil normal, no pain.

A sudden change came on the 29th June. Enormous mydriasis of the right pupil was accompanied by excruciating pain and amblyopia, so great that fingers close at hand could scarcely be counted. The disc was somewhat hazy. During this period the left eye read No. 17—19, but was free from pain. In August paracentesis of the right eye was tried; she then saw with that eye fingers to 1′ (read with O. S. No. 11), and had fearful pain; the latter was at once relieved. Next day she could read No. 20, and afterwards could make out No. 19, yet the pain returned during the day.

Again, on the 27th August, there was another change. The most dreadful pains again attacked the *left* eye; its pupil was dilated to the utmost degree (far more than in paralysis of the third nerve), the eyeball was very sensitive to the touch, the vision = No. 19. In respect to the right eye the pupil was normal, there was no pain, and No. 12 was seen. Paracentesis improved the left eye with reference to both pain and vision, yet only temporarily, so that it had to be repeated at short intervals. Till towards the end of October, the vision of the right eye steadily improved, whilst that of the left eye varied in ratio with the attacks of pain. Towards the end of the month and beginning of November (a large seton had been used since the end of September) a remarkable change commenced. The pains in the left globe steadily diminished, the pupil contracted, and the vision improved, whilst the lower eyelid became slightly reddened, sensitive to the touch, and constantly painful. S = (O.D.) No. 3 fluently, (O.S.) words of No. 5. The field of vision was, in a bright light, normal; in comparative darkness slightly contracted. The hyperæmia and hyperæsthesia gradually spread over the upper part of the cheek. During the attacks of pain, which were very severe, the cheek was red, very warm, and swollen to the angle of the mouth. Such continued the state to the beginning of December; fresh neuralgia of the left eye, accompanied by great mydriasis and impaired vision (about No. 15 to 20, and ultimately only perception of the movements of a hand) then recurred; the neuralgia of the eyelid and cheek appeared again on the 18th, and disappeared on the 27th December. The seton had been removed on the 28th November; it was again inserted on the 31st December.

January, 1862.—Violent pains in the eye; only once a cessation, from the 17th to the 20th, when the cheek was again affected. The pupil was very large and fingers could be counted to only $\frac{1}{2}'$ on the 26th; the field of vision was much contracted and the eyeball hard. A large iridectomy upwards was made; it was followed by contraction of the pupil, relief of the pains, S = No. 10. Field of vision at 7″.



She suffered towards the middle of February from most violent attacks of hysteria. On the 13th March the left eye again became painful, the pupil dilated, the vision sank from No. 10 to No. 17; a few days later neuralgia of the cheek. During 1862-63, the right eye remained healthy; the left eye painful, the pupil dilated, the visual field concentrically contracted, vision varying from No. 15 to counting fingers; no ophthalmoscopic change. Paracentesis and the injection of morphia gave relief only for a few hours, and were repeated from time to time.

On the 29th April, 1864, S (O.D.) normal, (O.S.) No. 19; left pupil dilated; paracentesis of the left eye for the last time. On the 2nd May No. 10 was read slowly; no pain; pupil smaller.

31st March, 1865.—No pain; left pupil larger than the right one; the finest print is read close at hand.

The author then passes to the relation of some experiments performed with a view to elucidate the relation between the neuralgia of the fifth nerve and the glaucomatous attacks.

The first question is,—how are the vessels of the iris, choroid, and retina innervated. As the vessels of the iris can be distinctly seen in many young white rabbits, he commenced with the following experiments:—

1. Division of the cervical sympathetic on one side was followed by congestion of the iris: irritation of the upper end of the divided nerve caused anæmia of the iris, and when the irritation was stopped, the congestion recurred.

2. Division of the fifth nerve on one side was followed by congestion of the iris; irritation of the sympathetic of the same side then produced no change.

3. Division of the cervical sympathetic on the one side, of the fifth nerve on the other produced equal congestion on both sides.

The author concludes from these experiments that the vasomotor nerves of the iris entirely depend on the sympathetic; that the roots of the fifth nerve send no vasomotor nerves to the iris, but that the vasomotor branches of the sympathetic pass with it, and are divided at the same time with it. He has also satisfied himself with the ophthalmoscope that the vessels of the choroid and retina depend in like manner on the sympathetic.

Having given an account of the manometer he used for measuring the amount of intra-ocular pressure, he relates two very interesting experiments which he made for the purpose of testing the instrument. In two adult rabbits about the sixth part of the iris was excised from the one eye; sixteen days later

when the wounds were perfectly healed, he measured the pressure both in the operated and the healthy eyes, and found in both cases 6 to 7 mm. less pressure in the operated eye than in the normal one.

Repeated experiments showed that division of the cervical sympathetic was constantly followed by a gradual fall in the intra-ocular pressure to the amount of 4 to 8 mm. This fact may be explained by other experiments in which the author tested the effects of belladonna on the intra-ocular pressure, and in which he found that atropine, whether applied locally or administered internally, considerably diminished the tension of the globe. Hence, if the congestion of the vessels, produced by division of the sympathetic, is the cause of the diminished tension previously mentioned, the action of atropine also must be to paralyse the vasomotor nerves. An injection of half a cubic centimetre of a one per cent. solution of atropine under the skin of the ear of a rabbit was followed by dilatation of the vessels, and increase of temperature from two or three degrees per cent.; moreover, as irritation of the cervical sympathetic had little or no effect, the atropine must have paralysed the peripheral expansions of the nerve or the muscular tissue itself of the vessels.

As the intra-ocular pressure is diminished by paralysis of the vasomotor nerves, we may conclude that it will be increased by their irritation. The experimental verification of this conclusion is very difficult, owing to the liability not to produce sufficient stimulation, or to paralyse the nerves by over-irritation.

The author thinks that his experiments are sufficient to prove that the normal intra-ocular pressure is regulated by the vasomotor nerves of the iris and choroid; and that the cause of glaucoma is a pathological irritation, either idiopathic or reflex, of these nerves.

The following experiment was intended to test the possibility of such a reflex irritation. The nervus auricularis posterior was divided in a rabbit; the vessels of the ear dilated, and the temperature rose. Irritation of the central end of the nerve caused violent pain and extreme contraction of the arteries of both ears; cessation of the irritation was followed by extreme dilatation; division of the sympathetic at once arrested completely the reaction of the vasomotor nerves.

Similar results were obtained in the ear by irritating the auriculo-temporal branch of the fifth, or its peripheral expansions in the lip or conjunctiva, and in the eye by irritating the central end of the supra-orbital nerve. Hence the author considers it proved that the vaso-motor, just as the musculo-motor nerves may be stimulated in a reflex manner through the sensory nerves. These considerations appear to justify the conclusion that in the cases related, the glaucoma was produced in a reflex manner through the affection of the fifth nerve.

The author concludes his able paper, by the remark that this reflex irritation of the vasomotor nerves is worth remembrance in respect to both physiological and pathological facts, for instance, in respect to pallor or redness from violent mental impressions, to total amaurosis accompanying paroxysms of facial neuralgia, to recurrent iritis in cases of posterior synechia, and sympathy.

TWO CASES OF TUMOUR OF THE BRAIN WITH OPTIC NEURITIS—AUTOPSY IN EACH.

By Dr. Williams, Cincinnati, U.S., Medical Record, March 18, 1868.

Case I.—An Irish coachman, æt. 50, died after an illness of about six months. His symptoms had been violent pain in the parts supplied by the left fifth nerve, followed a few weeks later by a sudden attack of convulsions succeeded by maniacal excitement. After this he had optic neuritis, blindness, and dilated pupils. There was bleeding from the left nostril and the left side of face was somewhat swollen. The disc was swollen, blurred, and prominent, and its veins much distended. It is said that the man had no positive paralysis, but he had bed-sores, and, as his left eye inflamed, and the cornea became opaque, it may be conjectured in the absence of any statement on the point, that he had paralysis of the fifth on this side as a sequel to the hyperæsthesia. The man at length sank. The following are the interesting particulars of the post-mortem.

"*Sectio cadaveris, by Dr. W. H. Taylor, pathologist of the hospital, seven hours after death.* Dura mater firmly adherent to the calvaria; membranes of the brain much engorged with blood; increased number of puncta vasculosa in substance of brain; two ounces of limpid serum in the lateral ventricles, which were much distended transversely; small amount of serum in the middle fossa. The anterior portion of the right hemisphere of the cerebellum was firmly adherent to the base of the cranium; and lying anteriorly to and below the right hemisphere of the cerebellum was a firm, oval, nodulated tumour enveloped in a distinct capsule attached to, but easily separated from, the membranes. The tumour measured four and a half and three and a half inches in circumference in the two directions, and in structure resembled encephaloid. It had compressed the right half of the medulla oblongata toward the median line. Imbedded in the substance of the cerebellum, above and behind the solid tumour, was a pyriform cyst containing transparent fluid. It measured two inches in the long and one and a half inches in the short diameter, and its apex extended into the crus cerebri. The surrounding brain substance was of a semi-fluid consistence."

Case II.—Dr. Williams' second case is reported in much

better detail than the first. A servant girl, aged 20, died after a two months' illness with severe cerebral symptoms. For some months before the date of its commencement she had, however, been liable to purposeless vomiting. Her severe symptoms set in suddenly; she became unable to hold anything in her hands; could not walk well or rapidly; failed in sight and hearing. In about a week she was quite blind, and her pupils were dilated and insensible; in this condition she first came under Dr. Williams' notice, unable to see, hear, or speak, and remarkably drowsy. Her pulse was 46 and irregular; respirations 15; extremities cold. The ophthalmoscope showed the discs swollen, opaque, and streaked with ecchymoses. After a month in the hospital the patient had improved somewhat. The right eye had now no perception of light, but she insisted that her left was perfect, although on trial she could only read Snellen 6½ at 6″. It was now ascertained that she had complete anæsthesia of the right side of the face and right eye. Her hearing and taste were now perfect, but there was some imperfection of sense of smell. She felt giddy, but could walk about the ward, and had no loss of motor power. She suffered from pain and heaviness over the eyes, but never in the back of the head. The pain was increased by any sudden motion. One morning (May 5th) she had severe vomiting, and complained of great pain in the forehead. She became comatose and died in the afternoon. She had not had any convulsions whilst in the hospital.

The following are the chief facts of the autopsy, which was performed by Dr. Taylor:—

"On removing the brain, a tumour was discovered about three inches in length lying under the left anterior lobe of the cerebrum, and extending from the falx cerebri, to which it was adherent, over the cribriform plate to the ethmoid, involving the left olfactory nerve, backwards and diagonally across the sella turcica to the right petrous bone, where the end of it pressed on the fifth nerve of the right side at its point of exit from the posterior fossa of the base of the brain. There was thus direct pressure on the left olfactory, the optic chiasm, the cavernous sinus and ophthalmic branch of the fifth nerve, as well as upon the main trunk of the trigeminus, at the seat of the Casserian ganglion. The posterior part of the tumour extended across to the right side, about an inch beyond the median line, producing a corresponding concavity in the right side of the brain. The posterior two-thirds of the tumour were very soft and red looking, very much like brain tissue in a state of red softening. The anterior one-third was about the size of a walnut, hard, pale, nodular and scirrhous in its character. When the brain was laid on the table, the tumour projected nearly an inch beyond the end of the anterior lobe. The loss of smell in the left nostril, and the complete anæsthesia of the right half of the face, receive

a ready explanation from direct pressure. The impairment of vision was due to a threefold cause—direct pressure on the optic chiasm; compression of the cavernous sinus, and obstruction to the venous return from the retina, giving rise to neuro-retinitis; and thirdly to increased intra-cranial pressure."

Dr. Williams directs attention to the fact that although the fifth nerve was quite paralysed for some weeks, yet no inflammation of the cornea followed. At one time the conjunctiva became congested "and the eye painful," but on use of a protective bandage the irritation passed away. If the eye became painful during the congestion, we must object that it is probable that the paralysis was incomplete. In cases of absolute anæsthesia the eye may go through all the stages of destruction without the patient ever having the slightest sensation of pain.

Dr. Williams records a third case of optic neuritis, in which the diagnosis of cerebral tumour was given, but as the patient is yet living the case is of less interest.

ALBUMENURIC NEURO-RETINITIS.

By Professor Roosa, of New York, Medical Record, March 16, 1868.

Professor Roosa, amongst various other clinical cases, relates one which interests us, because it is an example of what certainly occurs sometimes, and has not as yet been noted with sufficient emphasis. We allude to the occurrence of neuritis in connexion with albumenuria, without the peculiar changes in the retina usually met with in that disease.

The patient, a boy of 18, had been liable to sick headaches for a year. His sight had failed for four weeks before he came under observation. The writer thus describes the neuritis:—"On examination with the ophthalmoscope it is found that there is no appearance of the optic nerve entrance, except that the vessels may be seen emerging at the porus opticus, the veins tortuous and distended, while the normal appearance is not recognized at all. There do not seem to be any exudations or hemorrhages in the retina." The patient's urine was loaded with albumen. The professor adds: "I should remark that there are none of the peculiar patches in the retina which characterize nephritic neuro-retinitis, because the disease has not advanced far enough." This explanation is perhaps a little doubtful, for nephritic deposits are usually seen first near to the yellow spot, and there are, on the other hand, well marked cases in whch the disease is throughout a neuritis rather than a retinitis.

ECONOMIC STATISTICS OF THE HEIDELBERG OPHTHALMIC HOSPITAL.

Letter from Professor Knapp.

The following facts may be of some interest to those taking part in the present discussion as to special hospitals, &c. Professor Knapp, writing to an American Journal, strongly urges the propriety of establishing a second Ophthalmic Hospital in New York. We extract from his letter the following:—

"During the year 1867, in the Heidelberg institution, which is under my care, 3,314 eye patients have been treated; 706 were in-patients with a hospital sojourn of 14,268 days; 607 patients, with 10,488 days of keep ("verpflegtagen"), belonged to the poorer classes. The average duration of a patient's stay in the hospital was 20 days. The highest number of in-patients at the same time was 65; the average number 39. The institution has 65 beds. During the course of the year 413 important operations on the eye and its appendages were performed; 120 for common cataract, 15 for secondary cataract (some after the method of Dr. Agnew, N. Y.), 111 iridectomies, 81 operations for squint, and 66 of different kinds, such as extirpation of the globe, plastic operations of the lids, &c. The total income was 13,328 florins, the total expenditure 13,858 florins.

"There are very few ophthalmic establishments in Germany which have a greater number of patients. The reason of it is that Heidelberg, although a small town of only 18,000 inhabitants, has a celebrated university, with professors of world-wide reputation, such as Chelius, Helmholtz, Arnold, Bunsen, Kirchhoff, and is, besides, the medical centre of about one and a half millions of people. The government gives considerable aid to the ophthalmological clinic; and the neighbouring districts, of about 600,000 inhabitants, have, at my suggestion, made arrangements with the institution, so that every indigent eye-patient has a right for free treatment, and, if necessary, free admission into the hospital, the expenses of which are paid by the administrations of the said districts. This highly commendable arrangement only exists in the liberal grand-duchy of Baden.

"Since Prof. Gräfe, in Berlin, has had such a splendid success in starting a private ophthalmic institution, a great many smaller ones have been established in different towns of Germany; all have had a certain success at the beginning, but many of them now labour under great financial difficulties, and are gradually disappearing. My own opinion is, that special hospitals for eye-diseases in our country are only of need and likely to last in large cities and universities, where the State pays the unavoidable deficit."

CASE OF TRAUMATIC ANEURISM OF THE ORBIT—EXOPHTHALMOS—LIGATURE OF BOTH CAROTID ARTERIES, AND OBSERVATIONS ON THE STATE OF THE RETINAL CIRCULATION AFTERWARDS.

By Dr. Williams, Cincinnati:—Medical Record, April 15, 1868.

The following case is such an important one, that we extract it almost entire:—

"Dennis C., æt. 20, was admitted June 15, 1867. Seven months previous to admission he received an injury which caused a depression of the skull 2½ inches long, across the vertex from the left frontal eminence, followed immediately by exophthalmos of the left eye from aneurism of the ophthalmic artery. When admitted, his cerebral functions were unimpaired, and digestion perfect. The left eye was protruded beyond the equator, but the patient could still close the lids over it. The conjunctival, but especially the subconjunctival vessels, were enormously increased in number and size, and extremely tortuous, with slight serous chemosis at the outer canthus. There was a very strong pulsation, with an intense aneurismal thrill, and a very loud bruit, audible even to the patient himself, and most marked at the inner canthus and over the brow. Vision of this eye very imperfect. The ophthalmoscope showed the retinal vessels to be, like the external, excessively enlarged and tortuous, especially the veins. The optic papilla was greatly swollen, ill defined in its outlines, and greyish in colour, with very many minute points of ecchymosis. The blood-vessels disappeared, suddenly for the most part, in the swollen and opaque papilla, and were somewhat obscured for a short way beyond the disc. The vessels, arteries as well as veins, were very serpentine as far as they could be traced toward the ora serrata. Along the veins there were frequent ecchymoses, especially large where the vessels made sudden short bends.

June 22.—The left carotid was ligated. The thrill and murmur both ceased, but returned slightly after two hours. The vision, previously reduced to counting fingers at two feet, was not affected.

June 23.—Diminution of the thrill and bruit, the latter feebly audible to the patient.

July 1.—Thrill and murmur vary in intensity at different times in the day—rather on the increase.

July 9.—Seventeen days after the operation, the ophthalmoscopic examination was repeated. Same appearances as before operation, except an increased opacity along the course of the vessels, with more concentrated greyish patches at the knuckles where the short bends took place.

July 20.—Thirty days after the first operation, it being

evident that the aneurism was still not relieved, the other carotid was ligated in the same way by the same surgeon. Pupils were not influenced but remained active. Bruit and thrill completely silenced, but in five minutes were again heard very faintly. Vision, he says, is not worse than before the operation.

July 21.—Vision of left eye reduced to perception of light; pupil somewhat dilated, and responds feebly to light. Sight of the right eye intact—no thrill or bruit.

August 3.—Fourteen days after last ligation, the ophthalmoscope revealed a remarkable change in the fundus of the affected organ. Swelling and opacity of papilla nearly gone; vessels much straighter and smaller; exudation at points of sudden curvature disappeared, except two or three; some ecchymoses here and there in process of absorption; vessels of papilla, both arteries and veins, completely and instantly emptied by the least possible pressure on the eye with the finger. I could see them grow pale even before I was conscious of making any pressure, even the weight of the finger affecting their fullness. What was still more interesting, was the slowness with which both sets of vessels filled after the pressure was relaxed, and the entire absence of pulsations under any circumstances. This was true of the retinal vessels in both eyes, and the acuteness of vision was alike quickly affected by slight pressure, both facts showing the diminution in the vis a tergo, and the feeble circulation in the brain and retina after ligation of both carotids.

August 11.—Same condition with merest suspicion of bruit. It is now three weeks after the second ligation, and the vision of the left eye has so far improved that he can count fingers at two feet, and decipher No. 20 print, and see large familiar objects at seventy yards. Vision of the other eye perfect, but eyes easily fatigued with attempts to see small objects.

August 21.—Discharged, to return in three months.

DR. HUGHLINGS JACKSON ON CEREBRAL DISEASES IN CONNECTION WITH OPHTHALMIC SYMPTOMS.

In the fourth volume of the London Hospital Reports, Dr. Hughlings Jackson publishes thirty cases of cerebral disease, and as there are in many of them symptoms of ophthalmological interest, we may briefly draw our readers' attention to them.

In Case II. There was palsy of the fifth—with loss of eyeball—sixth, and other nerves from syphilis (autopsy).

Case III. Paralysis of the right third nerve with hemiplegia of the same side (autopsy). There was a neuroma of the right third nerve, and a syphilitic nodule in the left motor tract. In the right optic disc there were inflammatory changes, not in the left. This Dr. Hughlings Jackson thinks is to be accounted for by the local

effect on the right optic nerve of disease found at the base of the skull.

Then follow three cases of double optic neuritis, with convulsions beginning in the left hand, and epileptic hemiplegia. In each case there was syphilis, no autopsies.

Case IX. Is one of retinal degeneration, with retinal and cerebral hæmorrhage in a woman only 19 years of age. The kidneys were granular, and the left ventricle of the heart was much hypertrophied (autopsy).

Dr. Hughlings Jackson has recorded two similar cases with autopsies in the previous (the third) volume of the Hospital Reports referred to.

Case X. Is one of conjugate deviation of the eyes with turning of the head in a case of hemiplegia from clot (autopsy). In this case there were no morbid ophthalmoscopical appearances.

Case XIV. Is one of conjugate deviation of the eyes in a case of hemiplegia and hemi-spasm, the result of arachnoid hæmorrhage (autopsy).

Case XV. Is one of very extensive softening of the left cerebral hemisphere without changes in the discs (autopsy).

Case XXV. Abscess in the left cerebral hemisphere, with double optic neuritis, convulsion, and hemiplegia (autopsy).

Case XXVI. The same (autopsy).

Case XXVII. Swollen disc, with pyæmia from ear disease (autopsy).

Case XXIX. Double optic neuritis from hydatid tumour in the left cerebral hemisphere (autopsy).

AN IMPROVED METHOD OF EXTRACTION OF CATARACT.

Dr. Wolfe, of Aberdeen, has published, under the above title, a little book of 71 pages, which contains descriptions of several of the methods of extraction now in common use, and the announcement of a modified one, devised by himself.

Following Mooren's recommendation, Dr. Wolfe performs a preliminary iridectomy, six weeks before the extraction. In the extraction he uses a narrow Beer's knife, and makes a corneal flap in size a line more than a third of the circumference of that structure. When the corneal section is nearly completed, the edge of the knife is inclined backwards under the conjunctiva, and a bridge of the latter is left uncut. No speculum is used, and the patient is not under chloroform. The operator uses both his hands, one for the knife, and the other to steady the globe with a *pique de Pamand*, and leaves the lids to his assistant. Having completed the corneal section, but left a conjunctival bridge, he takes entire charge of the lids, and using the fingers of his left hand as a speculum, with the right snips through with scissors the portion of conjunctiva left undivided. Next, the capsule is

largely opened with cystotome, gentle pressure being made meanwhile, in order to keep the capsule tense. After a few seconds of rest, the operator takes a fold of the upper lid between the fingers and thumb of one hand, applies the thumb of the other to depress the lower lid, and to press against the globe, directs his patient to look down, and by simultaneous gentle pressure above and below, ejects the lens from its bed.

Dr. Wolfe speaks warmly of the results obtained by this method.

The work is illustrated by some rather diagram-like woodcuts. In the first of these the wire speculum is represented as buried in folds of skin quite external to the edges of the lids—an utterly impossible position.

RETINITIS IN BRIGHT'S DISEASE—DEATH OF THE PATIENT.

Dr. Orestes Pray relates in the "Medical Record," August, 1868, a case of albumenuric retinitis which ended fatally. The patient was a lawyer, æt. 52, who had suffered for some years from severe sick headaches. At length he began to pass more urine than natural, and his sight failed. Both retinæ were the seats of the characteristic changes. Dr. Noyes, of New York, confirmed the diagnosis. The quantity of albumen was so small, that it might easily have been overlooked. The failure of sight occurred rapidly; sickness and headache increased, and death, preceded by coma, occurred five weeks after the first ocular symptoms.

EXCISION OF THE EYEBALL FOR CANCER, AND NO RETURN AT THE END OF SIX YEARS.

Mr. Brudenell Carter records in the "Medical Times and Gazette" for February 20, 1869, the important fact, that a child whose eyeball he removed, for malignant disease, in January, 1863, is still alive and well.

On turning back to Mr. Carter's record of the case in December, 1863, the diagnosis of malignancy seems to have a little doubt attached. Before the excision, Mr. Carter "was inclined to think the disease tubercular." After removal the globe was examined by Dr. Monckton, of Maidstone, who writes, "The new growth itself was a little puzzling. The first glance at it under the microscope seemed conclusive as to its encephaloid character; but in seeking fresh portions, several distinct gritty calcareous particles were found, visible to the naked eye, and appreciable to the finger, which strongly suggested tubercle. I submitted a piece to Dr. George Johnson, of King's College, and he decides in favour of encephaloma, in which he says cal-

careous particles are not so uncommon as I had supposed. The development must have been rapid, for the cells were very numerous and small, having hardly passed beyond the nuclear condition." Although the diagnosis of cancer (or glioma) may be admitted to be very probable, it would probably scarcely satisfy Virchow. The tumour is described by Dr. Monckton as being developed in connection with the optic disc and retina, easily separable from the choroid, and the size of a small hazel nut. The patient was a boy, æt. 4, ruddy and healthy looking.

The original report is at page 583 of the "Medical Times and Gazette" for December, 1863.

STATISTICS OF THE MANCHESTER ROYAL EYE HOSPITAL.

The fifty-second annual report of the Manchester Eye Hospital contains, as usual, a well-arranged table of the diseases treated during the year. It appears that, including accidents, an average of 12½ new patients apply daily, and that the total of admissions during the year was 3,872. Of these 398 were made in-patients. The average stay of each in-patient in the hospital was four weeks and a day, and the average cost for board tenpence a-day. There were 110 cases of cataract, and for these 118 operations were performed. Flap extraction was done in 17 cases, linear in 20, Graefe's new method in 26, Teale's suction method in 4, Pagenstecher's in 2, discision in 43, removals of capsule in 6. There were 30 cases of glaucoma, and iridectomy for this and for other diseases was performed 150 times. As regards the rarity of certain diseases, we may note that Bright's disease of the retina occurred but once; Retinitis pigmentosa five times; Exophthalmic goitre once; Apoplexy of retina three times; Cyclitis once, and Astigmatism only twice. There were two cases of embolus of the central artery of the retina. (These ought to be published.) We envy our Manchester confrères their light work in the matter of spectacles. During the whole year there were (exclusive of cataract cases) something short of 100 cases needing glasses;—Myopia 36, Presbyopia 22, Hypermetropia 39. That many patients still fall into the hands of careless prescribers is implied by the fact that no fewer than 15 applied in consequence of lead deposits in the cornea. This proportion is much higher than that of Moorfields. Of herpes ophthalmicus, molluscum, or rodent cancer, not a single case is tabulated, but possibly those of "epithelioma" belong to the last mentioned.

Under the head of Operations on the Lachrymal Passages, we have Weber's operation in 65 cases, Bowman's in 9, and obliteration of sac in 6.

Abscision of the globe (Critchett's operation) appears to

maintain its ground. It was performed in 11 cases, and enucleation in 15 others.

The report bears testimony to the care with which the statistics are kept, and is very creditable to the Institution.

ON A NEW AND SIMPLE MEANS OF DETECTING MIXED ASTIGMATISM BY THE OPHTHALMOSCOPE.

We make the following extracts from a paper by Mr. Couper, in the "Medical Times and Gazette," for January 30, 1869:—

"It lately occurred to me, while examining some cases of mixed astigmatism with the mirror alone, that both an inverted and an erect image ought to be alternately visible, according as the fundus is viewed through the meridian of greatest or that of least curvature of the media. I selected for examination a boy of 13, who has myopia $\frac{1}{18}$ in the vertical meridian, and absolute hypermetropia $\frac{1}{18}$ in the horizontal meridian, and after fully dilating the pupil by atropine, endeavoured to analyse the eye, and, as it were, separate one section of the media from another by means of a diaphragm furnished with a narrow slit. Through this slit, held alternately in the plane of the least and of the greatest curvature of the media, I sought to illuminate the fundus and obtain an alternately erect and inverted image of it, but I failed. Too little light was admitted by the slit, and there was a difficulty in keeping it opposite the pupil.

"On resuming the examination without the slit, I saw the erect image plainly when vertical branches of the retinal vessels were made (by appropriate movements of the observed eye) to sweep horizontally across the area of the pupil. The reason of this was obvious. Rays diverging in a horizontal plane from any point in these vessels are refracted by the horizontal section of the media—the meridian of least curvature in this instance—and, holding, as they do, a slightly divergent course after leaving the cornea, are in a condition to come to a focus on the observer's retina.

"This erect image, however, underwent a peculiar distortion, as though a vessel changed the direction of its curve in sweeping across the field. Thus it mattered not whether the vessel was seen at the extreme right or the extreme left of the pupil; it always presented a concave bend towards the centre of the pupil. I was soon convinced that this confusion of the image was due to the fact that, while the straight vertical part of the vessel was viewed erect, the curved part was seen inverted, and therefore with an apparent motion opposite to that of the other, because seen by means of rays diverging in the vertical plane and refracted by the meridian of greatest curvature of the media.

"Reasoning from this, I argued that I ought to see an in-

verted image of horizontal retinal vessels by making their image sweep in a vertical direction through the pupillary area; and, on putting the matter to the test, I did, in fact, get the inverted picture with the utmost distinctness.

"I had arrived, therefore, at this result, that, taking the precaution to recede sufficiently to make sure of seeing an inverted image, should there be one, and then simply causing the observed eye to follow gentle movements of my forefinger, first in a horizontal and then in a vertical direction, the erect and inverted images successively came into view without any change in my distance from the patient, and without any change in the adjustment of my eye.

"I now turned to the other eye, which was not under atropine, to learn if both images were as readily seen through an undilated pupil. They were as visible as ever, but it was now necessary, on account of the lad's perfect power of accommodation, to have his eye adjusted for a distant stationary object, and to give rise to apparent motions of the ophthalmoscopic image by movements of my own head.

"I had soon the opportunity of repeating these observations on an eye with hypermetropia $\frac{1}{12}$th absolute in the horizontal plane, and myopia $\frac{1}{20}$th in the vertical plane. Here the inverted image being formed at a distance of twenty inches, I had to recede about thirty or thirty-two inches from the eye in order to see both images. Even at this distance both were readily distinguishable, and I have no doubt that as small a degree of mixed astigmatism as of hypermetropia or myopia can be thus recognized, and I am satisfied that the ophthalmoscopic test will prove as practically useful in the first as it has proved in the two latter."

THE MECHANISM OF ACCOMMODATION.

[*An Abstract reprinted from the Journal of Anatomy and Physiology, November*, 1868.]

Coccius has made a number of observations on the mechanism of accommodation in the human eye by examining during life the eyes of those who had had iridectomy performed upon them. He observed that when the accommodation of the eye is altered from that for a distant, to that for a near object, the ciliary processes advance and become somewhat larger; the zonule becomes broader; and the dark band which represents the border of the lens becomes broader and darker. Atropine occasions a decided retraction, Calabar bean, a decided advance of the ciliary processes. He thinks that the cause of these changes can only be found in the action of the ciliary muscle. He thinks that the ciliary muscle cannot have a fixed point anywhere but anteriorly near the canal of Schlemm, else the ciliary processes could not be drawn forward. He thinks that the lateral swelling

of these is due to compression of their veins by the contracting muscle. The increased curvature of the lens during positive accommodation (accommodation for near objects) is according to him not only due to the traction exercised by the ciliary muscle, but also to pressure.

Helmholtz's theory is that during negative accommodation the lens is kept flat by the elasticity of the zonule, and that during positive accommodation the ciliary muscle counteracts the action of the zonule, and the lens becomes more convex by the action of its own elasticity. In opposition to this, Coccius adduces the fact that the transition from accommodation for distant to that for near objects, takes place more rapidly than the inverse movement does. He thinks that this fact does not favour the idea that the elasticity of the zonule is greater than that of the lens, but that the lens returns to its somewhat flattened form during negative accommodation by reason of its own elasticity.—(From an abstract in the "Centralblatt," Nos. 31 and 32, 1868.)

On the other hand Hensen and Völckers (Experimental untersuchung über den Mechanisums der Accommodation. 8vo. pp. 56, Kiel, 1868), from numerous experiments on the eyes of dogs and pigs, support Helmholtz's theory of accommodation.

These authors made also some interesting observations on the movements of the iris in the dog. They found that after removal of the ciliary ganglion the pupil is of medium size and insensible to the action of light. Nevertheless irritation of the cervical sympathetic produced dilatation as before removal of the ganglion, showing thereby that the sympathetic fibres do not pass through the ganglion: they form fine fibres which lie either upon the optic nerve, or in the surrounding tissue: irritation of the peripheral ends of these after they have been divided dilates the pupil, while irritation of the central portions occasions pain. Irritation of the ciliary nerves caused extreme contraction of the pupil. Irritation of the four chief ciliary nerves occasioned a pear-shaped contraction of the pupil. Dilatation of the pupil followed the use of atropine after, just as before removal of the ganglion.

After laying bare the ciliary muscle by removal of a portion of the sclerotic, it was seen to sink when the ciliary nerves were irritated, the portion of the choroid lying behind became arched forwards synchronously with the sinking of the muscle.—(From an abstract in the "Centralblatt," 1868, Nos. 29 and 30.)

A. V. GRAEFE ON THE DOCTRINE OF SYMPATHETIC OPHTHALMIA.

Archiv. f. Ophthalm., vol. xii, section 2, pp. 149–174.

The doctrine of sympathetic ophthalmia is in many points still much in need of the supporting and correcting aid of accurately observed facts. Although all are agreed that an inflammation

of one eye, may under certain circumstances seize on the other, yet the peculiar nature of these circumstances is still shrouded in obscurity. It is indeed known that such a transmission is chiefly consequent on injuries, and most frequently of all on injuries with retention of foreign bodies. But it has been observed even without previous injuries, and has been on the other hand completely omitted in a very large number of cases of injury (even when the foreign body was retained). The question of the proximate causes of the sympathetic transmission from the one eye to the other, seems therefore to form the most important problem for the right appreciation of the etiology of this strange disease.

Without denying the fact, that it is and will remain in many cases extremely difficult, nay to a certain degree almost impossible to distinguish the *successive* seizure by an internal disease, acting on both eyes in common, from the *relative dependence*, which exists between both eyes in reference to certain forms of inflammation, v. Graefe yet considers it necessary to add something as to the modifications which his views have recently undergone.

First of all, it must be observed, that v. Graefe is no longer inclined to assume that simple *increase of tension* can of itself produce sympathetic ophthalmia, he inclines to think that a hyperplastic cyclitis usually intervenes.

"*A peculiarly painful sensation on touching the region of the ciliary bodies*" is considered by v. Graefe, as the chief symptom characteristic of hyperplastic cyclitis. This symptom may indeed be somewhat obscured by a condition of increased tension of the globe, the conduction in the ciliary nerves being in that case diminished, but if it is observed with diminished tension, and not only transitorily, but continuously, it must be looked upon as a symptom of plastic cyclitis, and as very important in respect to the other eye.

Cyclitis or irido-cyclitis usually proceeds from malignant iritis, the malignancy of which arises chiefly from an irrepressible tendency to cell proliferation on the posterior surface of the iris, which may very soon extend to the ciliary processes. The picture of this malignant iritis is drawn with an accustomed master-hand. The observation is added that the rapid transition of this iritis into irido-cyclitis is indicated by even more definite signs, among which are reckoned "the striking fluctuation in the consistence of the globe, the great painfulness of the ciliary region on touch, under certain circumstances symptoms of affection of the vitreous humour, and at last a definite change in the position of the iris," which latter seems to be dependent on a retraction of the periphery of the iris, in consequence of an agglutination of the posterior surface to the ciliary processes.

As very important for practice, v. Graefe refers to the fact that very violent suppurative inflammation, in which the greater part of the cavity of the globe is filled with pus, does not constitute a cause of sympathetic disease, and recommends, on the strength of this fact, the advantages of artificial stimulation of suppurative iritis by means of the seton, a plan much recommended by him formerly.* The explanation v. Graefe finds in the simultaneous destruction of the ciliary nerves—that is, of the channels through which the inflammation travels from the one eye to the other.

The enucleation of the eye first affected, which, according to the rule now in vogue, is to be carried out immediately on the appearance of sympathetic phenomena, yields, according to Critchett's† and Graefe's experience, by no means such brilliant results as was formerly believed. The successful results refer chiefly to that milder form of sympathetic iritis, which appears on the whole in the shape of secretory inflammation (iritis serosa); in the case of malignant iritis progressing with the formation of deposits on its posterior surface, enucleation of the eye first affected, does not commonly, essentially retard the process in the other if distinct traces of a diseased state were already perceptible in it. V. Graefe could only observe a cessation extending over several days, but not a permanent digression from the typical course. He adheres, nevertheless, to his former practice of enucleating the first eye on the commencement of sympathetic irido-cyclitis, *whenever it is fully blind*, and especially if it is moreover, *painful on touch*, since the cause which produced the sympathetic disease will probably continue to aggravate the condition, and to prevent therapeutical interference with the second eye. But if even only a small vestige of sight is left in the first eye, it might be advisable not to undertake the operation.

Completely agreeing with Critchett, v. Graefe likewise thinks that operations on the eye secondarily diseased must for the most part be abstained from during the acute stage. Apart from the great, often even insurmountable, difficulties of iridectomy, the reactionary formation of the inflammatory products will usually be the result of operative interference. The evil is thus aggravated instead of being diminished.

V. Graefe has, however, again taken up the experiments with iridectomy on the sympathetically affected eye. He performed iridectomy, as he is now in the habit of carrying it out as a preliminary procedure in extracting the lens, making the wound quite peripherally and with a narrow knife. In this way the operator succeeds more easily in removing a considerable portion of the iris, and in one case, which is communicated in

* Archiv. f. Ophthalm. xii, 2, p. 105.

† Klinisch. Monatsbl. f. Augenheilkunde, I. p. 440.

detail, the visual power rose after the operation from $\frac{1}{5}$ to **1.** Whilst this case affords encouragement to further trials, v. Graefe nevertheless insists upon undertaking the operation at once, as soon as its ominous course is distinctly marked, for if malignant sympathetic iritis is allowed to establish itself, increasing objections are opposed to operative interference, and for such a case v. Graefe repeats, with all urgency, his advice of expectancy (three to four months), until especially all phenomena of sensitiveness in the ciliary region and some other symptoms disappear, or, at least, decrease perceptibly.

The operation, which is only required afterwards in the period of remission, consists in the extraction of the lens, as well as of the iritic deposits intimately united to the capsule of the lens.

The author concludes with some observations on the less dangerous form of sympathetic iritis serosa, adding the short history of two peculiar forms of disease, on the sympathetic mode of origin of which there can exist no doubt, and which he denominates retinitis-sympathica, or choroido-retinitis sympathica.

[N.B.—The above is a translation (with omissions) of an able abstract of Graefe's paper by Zehender.—Ed.]

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Part I.

Original Contributions.

A FEW MISCELLANEOUS CASES.

By George Cowell, F.R.C.S.

The following case of neuro-retinitis appears to be worthy of record in the Ophthalmic Hospital Reports, on account of the regularly radiating striæ seen in relation with the yellow spot. Striæ are as common in syphilitic retinitis as spots are in the albumenuric form of the disease, but I never saw the regularity with which they are often arranged so beautifully marked as was witnessed in this patient. According to the microscopic examinations which have been made by various pathologists in similar cases, the connective tissue of the nervous layer of the retina appears to be the situation of the striæ. Their brilliancy would be in favour of their being retinal in this case.

No. I.—*Case of Syphilitic Neuro-retinitis in the Left Eye—regularly striated form of deposit around the yellow spot.*

Chas. W. Guest, æt. 29, a rather stout, florid man, was admitted as an out patient, Nov. 19, 1868. He gave the follow-

ing history:—The sight of the left eye, which has been gradually getting worse, began to be affected three weeks ago. He had syphilis four years ago, and twelve months since had a slight rash on the chest and under the arms, but no sore throat. He states also that he suffers from "spermatorrhœa." He has had some pain, of a slight aching character, in and around the left eye, with a general mistiness of vision. He now reads, with that eye, No. $3\frac{1}{2}$ Snellen, and with the accommodation at rest the acuteness of vision $= \frac{20}{50}$. In the right eye, S. $= \frac{20}{20}$. Both eyes are emmetropic. There has been no iritis.

Ophthalmoscopic Examination.—The media are quite transparent. The optic disc is swollen and covered with lymph, the retina around the disc is gray and opaque to the extent of $2\frac{1}{2}'''$, the margin of the disc and the choroid to this extent are obscured, the infiltration gradually shading off to the healthy retina and choroid. The retina is also somewhat swollen and opaque, and of a whitish gray colour by the sides of the larger vessels, the veins are large and tortuous, but there are no apoplexies, and the arteries are normal. The yellow spot is dark in colour, and radiating from it in every direction but that most distant from the optic disc are numerous *fine* white striæ, nearly one line in length, arranged with the most beautiful regularity, and close together. The striæ are exceedingly delicate and brilliant, not coalescing, but leaving a central space, about a line in diameter, which is occupied by the fovea centralis.

Treatment.—Four leeches were applied over the malar bone, and calomel and opium prescribed. The gums speedily became tender, and the pills were discontinued at the end of seven days, when iodide of potassium, in eight grain doses, was substituted, which again four days later was increased to ten grains, three times a day.

November 30th.—The note of the ophthalmoscopic appearance to-day is that the lymph is becoming absorbed, the retinal infiltration is subsiding, and the delicate white streaks around the macula lutea are disappearing.

Jan. 7, 1869.—The retina is somewhat opalescent round the yellow spot. All the striæ have disappeared, but there are seven or eight minute white dots taking their place. The lymph over the disc is all absorbed, but there are still some whitish

streaks by the sides of some of the vessels. The choroid round the optic disc, where it had been most hidden by the infiltrated retina, is much atrophied. The optic disc is white, but the vessels are of a fair size. There has been no appreciable improvement in the acuteness of vision, but the sense of mistiness has materially diminished.

The following case is an instance of the persistence of a portion of the central canal, which is formed during the development of the vitreous humour, and serves in the fœtal state for the transmission of the capsular artery. The ophthalmoscope not unfrequently reveals some slight remains of it in relation with the optic disc, usually from half to three-quarters of a line in length, but it is comparatively rare to find any greater length. In one case, however, which has been recorded, the obliterated canal was visible in its whole length. Its position is usually the centre or the outer margin of the optic disc, whence it projects forward into the vitreous chamber, and is often sufficiently minute and tapering to be very easily overlooked.

No. II.—*Case of Persistence of a portion of the Fœtal Central Artery, in a Patient æt.* 32.

Sarah Ann Barnes, æt. 32, presented herself Aug. 1, 1867, with two or three posterior synechiæ, the result of an attack of iritis, which had occurred a few weeks before. On making an ophthalmoscopic examination of the left eye, there was seen projecting forwards, from a perfectly healthy optic disc, an opaque filament, of a greyish colour, tapering to a point, and apparently about 2½ lines in length. It occupied the centre of the disc at the point of emergence and bifurcation of the central artery of the retina, of which it seemed to be a continuation. By viewing it in various positions of the eye, it was seen to stand out in relief.

The following case is a well-marked instance of what I believe to be of less uncommon occurrence than is generally supposed—cicatricial opacities of the vitreous

body. I have several times seen them after needle operations for opaque capsule, and have no doubt they would not unfrequently be found to be the cause of the non-acuteness of vision in those cases where a better result might have been anticipated. I believe they occur only where the vitreous is not in a healthy condition, or where the instruments used were not clean.

No. III.—*White Cicatrix in the Vitreous Body in a Child, æt.* 13, *after a Wound six months before.*

Sarah Smith, a healthy-looking child, æt. 13, was brought to the Hospital Oct. 26, 1863. Six months before she had, with some violence, accidentally inflicted a wound on her eye with a pair of scissors. The wound was situated about three-quarters of a line internal to the cornea, and a little below the equator of the eye, and its position is now marked by a small firmly healed cicatrix. The eye looks bright, but the anterior chamber is rather small, and the movements of the iris are not quite free, although the pupil appears to be quite round. She can only count fingers with that eye. In the other the vision is good.

After the instillation of atropine, two or three small posterior synechiæ were found to exist; the lens was quite transparent. A short distance behind the lens, passing obliquely from the situation of the cicatrix in the sclerotic, and terminating in the vitreous substance, was a white, tapering, apparently tubular cicatrix. The vitreous was otherwise transparent and healthy; the fundus of the eye also appeared to be perfectly healthy. Peripheral vision was improved by the partial dilatation of the pupil, but central vision was impossible, from the position and size of the cicatrix.

Remarks.—This cicatrix without doubt occupied the track of the wound made by the blade of the scissors. The wound must have been made with sufficient violence to contuse the structures through which it passed, and perhaps the scissors were not clean. One or both conditions would have produced some suppuration and the resulting cicatrix.

The following case is one of rupture of the two internal tunics of the eye at the point opposite to and

most distant from the place of incidence of the blow. It is particularly interesting from its extraordinary similitude to an ordinary posterior staphyloma, the conditions of which, indeed, it gradually assumed, so that at the last examination the appearance presented might have led to its diagnosis merely as such, had not the eye been under observation previously. The case well showed too the tendency to gape which exists in wounds of the choroid when transverse, that is, in a direction more or less parallel to the margin of the disc.

No. IV.—*Rupture of Choroid and Retina in the right Eye, produced by a blow from a tip-cat—Retinal vessels torn—Hæmorrhage—Subsequent atrophy of the Optic Nerve.*

George Rogers, a healthy boy, æt. 10, was brought by his mother to the hospital on September 24, 1868, on account of loss of vision in the right eye. The history was, that two months before he had had a violent blow on that eye from a tip-cat, that most dangerous of toys; that the lids had become swollen and discoloured from the ecchymosis produced, and that three days afterwards, when the swelling had subsided so that he could open the eye, it was discovered that he could not see with it. He cannot now count fingers with the eye in question, but has perception of light and bright objects. No traces of any injury are visible externally. The vision of the left eye is perfect.

On making an ophthalmoscopic examination, after well dilating the pupil with atropine, I found that the eye was a slightly hypermetropic one, all the media were quite transparent, and the tunics of the eye were generally healthy. Immediately below the disc, and extending outwards below the yellow spot, was a rent in the choroid and retina. These structures appeared to have been torn from the lower margin of the disc to the extent of nearly half its circumference, and had retracted from it a distance of upwards of a line. The wound narrowed off inwards, just as in the case of an ordinary posterior staphyloma, but outwards the rent extended about a line and a half at a tangent from the disc, the apex of the wound being sharp

and pointed, and with every appearance of the termination of a rent. The retinal vessels had been torn across, and appeared slightly curled at the lower margin of the wound. There were remains of a clot, occupying the area of the wound, allowing, however, the white sclerotic to be seen in places more or less distinctly. At the margin of the wound were several dots of pigment. The optic disc was white and tilted so as to appear oval in shape.

November 19th. The distal end or apex of the wound had undergone a change, it was seen to be rounded off. The optic disc was rather whiter.

March 25th, 1869. The optic disc has become very white and shrunken, or, perhaps, more correctly, the whiteness has assumed a slightly bluish tinge. The arteries and veins have become invisible in the disc itself, although visible in the retina. Some perception of light still remains to the eye.

Both eyes are slightly hypermetropic. The fundus of the left eye is perfectly healthy. The right eye was good before the accident.

The following case is also one of rupture of the choroid at a point distant from and opposite to the point of application of the blow. Here the choroid only was ruptured, and from the position of the wound the vision was less implicated. In this case, also, the gaping tendency of these lesions is well marked.

No. V.—*Rupture of Choroid produced by a blow with a stone—Rent situated a short distance internal and parallel to the optic disc—No primary lesion of the Retina—Useful vision.*

Geo. Provost, æt. 13, was brought to me May 18th, 1865, with the history of a blow on the right eye with a large stone three months before. For a fortnight the eye was "blind." Vision has since been returning, but the eye is "not so good as the other." He only reads with it No. 6 Jaeger. The ophthalmoscope showed a perpendicular rent in the choroid, only about a line and half in length, and a line and quarter internal to the optic disc. The wound was widest at the middle, measuring nearly three-quarters of a line, and tapered to a somewhat

rounded point at either end. The time which had elapsed since the injury would account for the slightly rounded apices of the rent. The spindle-shaped portion of sclerotic thus exposed was seen of a brilliant white, crossed by a few small retinal vessels, the margin of the choroid being marked by a few small patches of pigment. The optic nerve appeared to be healthy.

This will, perhaps, be a good opportunity for mentioning a case, of which I have very imperfect notes, but which was seen and diagnosed by Prof. A. v. Graef, at a visit to the Ophthalmic Hospital in 1864. The case was one of perforation of the retina. In Dr. Liebreich's Atlas of Ophthalmic Drawings there is one of a larger perforation than the present case, but it represents its condition as seen after the exposed choroid has become atrophied. I know of no drawing of a recent case.

No. VI.—*Recent perforation of the Retina—Subsequent atrophy of exposed Choroid.*

Jane Butler, æt. 21, apparently in good health, and with no evidence of syphilis, presented herself, October 31st, 1864, in consequence of great deterioration of vision in the right eye. I have, unfortunately, no record of its exact amount. The ophthalmoscope revealed a distinctly red, granular-looking, oval spot, $1''' \times \frac{3}{4}'''$ in size, and situated between, but somewhat lower than, the optic disc and yellow spot. Prof. v. Graefe was kind enough to examine the case, and pronounced it a recent perforation of the retina. The choroid was then bright red and granulating, but after a time it gradually became atrophied. When the eye was examined twelve months afterwards the red granular appearance had disappeared, and a white oval portion of the sclerotic was seen to occupy its position.

The following case is an extreme instance of the results of wearing a glass eye, by a class of patients, with whom it is extremely improbable, and generally impossible, that they should be able to afford to purchase a new one, when the old one ought to be discarded as having become unfit for wear, and positively a source of irritation. From

want of proper care and cleanliness the eye seldom remains fit for wear for so long a time, as with a higher class of patients, and yet from a reluctance to appear without it, and the absence of the means of replacing it, they continue to wear it long after it has become a source of irritation. Patients who are wearing them often return to the hospital with chronic conjunctivitis, accompanied by more or less discharge, the disorder being often of a granular character. This at once disappears on discarding the source of irritation.

No. VII.—*Warty growths from the Conjunctiva from the Irritation produced by wearing the same Glass Eye for upwards of six years —Removal with good results.*

Emily Bacon, æt. 22, much marked with the small-pox, which probably explains the necessity for the extirpation, presented herself at the Ophthalmic Hospital, December 14th, 1865. She had been wearing a glass eye, which was given to her after the operation, for upwards of six years. Her palpebral and orbital conjunctiva is covered with *hard* warty growths, some of them coalescing, others distinct, with prominent, rounded, or where pressed together, flattened surfaces. Some of the larger masses are circular, others oval in shape, the largest being of the size of a bean. The orbit seems filled with them, but without in any way distending the lids. There is a little rather thin discharge. She has had some discharge for years, but cannot say when it first commenced; in spite of it, however, she has continued to wear the glass eye. The warty growths were first noticed six or seven weeks ago, but the artificial eye was still continued until there was no longer any room for it. The warts have grown rather rapidly during the last eight days. There has been no pain. The patient is unmarried, and works at a sewing machine. There is no history of syphilis, and none of cancerous disease in her family. Her health is good and the catamenia regular. The artificial eye has lost all its lustre, it presents very much the appearance of ground glass, though the roughness is less than one would expect from so prolonged an exposure to the action of the tears.

Treatment.—I freely removed the growths, leaving, however,

as much conjunctiva as possible, so as to diminish the subsequent contraction. It was obviously better to trust to subsequent applications to remove those smaller growths, near the margin of the lids, which were less warty in their character and free from hardness.

December 21st. Portions of the wound near the angles of the lids appeared highly granular. The wound and conjunctiva were well painted with liquor Plumbi Subacetatis, and the patient was ordered to repeat the application night and morning.

January 15th, 1866. The wound is shrinking well, there are two or three small tubercles of a warty character near the inner canthus. To continue the application.

February 23rd. The growths have entirely disappeared. The cicatrix is contracting. There is no discharge.

The four following are cases of vesicles occurring on the cornea, and are perhaps worth briefly recording here. In two there were vesicular affections elsewhere; in the others no skin affection existed. In one of the latter there was a vesicle symmetrically situated in both corneæ. Several writers have brought forward cases to show the relation between some superficial eye affections and certain skin diseases, and have succeeded sometimes in establishing their identity. It is not at all uncommon to get some conjunctival affection co-existing with syphilitic eruptions about the lids and face; and two of the following cases seem to establish a connection between a vesicle on the cornea and a similar lesion of the skin in some other part of the body. The conjunctival layer of the cornea is not so loosely attached to the cornea proper as the cuticle is to the true skin, and thus vesicles on the cornea are somewhat uncommon. In a chronic form they occur in certain morbid conditions of the eye, sometimes as the result of inflammatory action, but generally from impairment of nutrition. They sometimes occur in leucoma and some forms of keratitis, and in long standing and severe cases of conjunctivitis, the epithelium in a thickened state being raised from its basement membrane. In these

cases the cornea becomes more or less opaque and degenerated. Mackenzie mentions cases of chronic vesication which he terms dropsy of the cornea where it has occurred without any previous inflammation of the eye, and with the cornea perfectly clear. Of this, the 4th case is an instance. Mr. Bowman, in his lectures, delivered at Moorfields some years ago, relates a case where it had occurred as the result of slow disorganizing action, whereby the general nutrition of the organ was impaired. Mr. Bowman mentions that he had seen the same state in several other instances.

No. VIII.—*Vesicle on Right Cornea—several large Vesicles on the Hands and Right Wrist.*

J. M., a cachectic looking man, æt. 39, presented himself in June, 1862, complaining of smarting pain in the right eye, and some intolerance of light. A small transparent vesicle was seen nearly in the centre of the cornea. The drop of fluid contained within it gravitated to the most depending part, throwing thereby the corneal vesicle into minute wrinkles. There were several large vesicles on the hands and right wrist. The patient had been the subject of syphilis, but there was no rash to be seen, nor was there any ulceration of the throat. The vesicles were punctured, and a purge prescribed, and the patient got rapidly well. He did not present himself after the tenth day, so that it is not recorded if any permanent marks remained.

No. IX.—*Large Oval Turbid Vesicle of Cornea found during an Attack of Conjunctivitis of a slight character—no Skin Disease.*

Maria Stevenson, æt. 27, a cook, apparently much addicted to the free use of stimulants, came to the Hospital August 18, 1862, with a moderate attack of conjunctivitis. Her health appeared to be much disordered. She was relieved by the ordinary remedies.

On September 4th, however, she returned to the Hospital with an inflamed condition of one eye, much lachrymation, and a large vesicle on the cornea, which she stated she had first observed on the preceding day. The vesicle was very prominent,

but flaccid, and containing a drop of turbid fluid, which, as in the preceding case, gravitated to the bottom of the cavity. It was oval in shape, and occupied a position from a little above the centre of the cornea to within a quarter of a line of its lower margin. It was very painful. The patient had been the subject of no skin disease, and had received no injury. The vesicle was punctured and various modes of treatment were adopted without benefit. At last arsenic was prescribed, but the patient soon after ceased to attend, and the result of the case is unknown.

No. X.—*Oval Vesicle on Left Cornea—Bullæ on Arm and Neck—slight Fever—speedy Recovery.*

D. Nevell, æt. 40, came to me at the St. George's and St. James's Dispensary, on March 11, 1863, with several bullæ on the arm, and one large one on the neck, accompanied with a slight febrile attack; there was considerable heat of skin. He also complained of "a feeling of weakness" in the left eye, but no pain, and on examination I discovered a small, oval, transparent vesicle on the cornea, to the outer side of the situation of the pupil. It contained some almost clear fluid, which as usual gravitated to the lower part. The case speedily yielded to saline treatment followed by tonics. The corneal vesicle was punctured.

No. XI.—*Symmetrical Transparent Vesicle in each Cornea in a Patient 60 years of age.*

Louisa Clark, æt. 60, came to the Hospital May 16, 1867. A small round vesicle, about three-quarters of a line in diameter, rather less in the left, was seen on the cornea of both eyes. They were situated downwards and inwards in both, at a point midway between the centre and margin of the cornea. They produced slight "malaise" and lachrymation. The eyes were good, with presbyopia of $\frac{1}{10}$. The vesicles were punctured and she was ordered to wear a bandage over the eyes for a few hours after she reached home.

May 23.—The vesicles had partially refilled. They were again punctured. A fortnight later they were quite cured. Glasses of + 11 were ordered.

I alluded above to the fact of the occurrence of conjunctival affections, with syphilitic eruptions about the lids and face. The following is a well-marked case:—

No. XII.—*Circular Patches of Conjunctival Inflammation co-existing with Syphilitic Eczema of Face—repeated Recurrence.*

Albertina Barker, æt. 34, came to the Hospital, June 2nd, 1862, with both sides of the face and forehead covered with chronic eczema of a syphilitic character. On this occasion the skin affection was accompanied by a pustular form of ophthalmia. Iodide of potassium was administered for six weeks, when she was discharged, the eyes quite well, the face much improved.

The patient reappeared Feb. 2, 1863, with a similar attack, was treated in the same way, and was discharged April 20th. Face also as nearly as possible well.

October 29.—Came with a small ulcer of one cornea for which quinine and iron was taken for two weeks, when she was again discharged cured.

July 21, 1864.—Returned with chronic eczema of both cheeks, nose, both eyelids, and lower central part of forehead. The right eye presented an appearance different to the previous attacks. There were two circular patches, one on the cornea, and the other on the conjunctiva, just internal to the cornea, both of which presented some of the characteristics of the eruption on the face. Of course there was a good deal of conjunctival injection in the affected eye. The malady again yielded in about six weeks to iodide of potassium.

July 2, 1866.—Has had one recurrence since last attendance, but was too far away to come to the Hospital. She comes to-day with an exactly similar attack. It was again relieved by the same treatment.

THIRD SERIES OF CASES OF HERPES FRONTALIS.

By Jonathan Hutchinson.

Although a very considerable number of cases of herpes frontalis have now been recorded, yet the subject seems to me of sufficient interest to warrant the publication of others. I now add those which have come under my notice since the last number of our Journal was issued. None of them illustrate any new points, and all support my former inference that the nutrition of the eyeball is endangered only when the disease affects the oculo-nasal twig, a circumstance which is made apparent by the appearance of the eruption on the tip of the nose.

Several of my recent cases have shown, in an interesting manner, how very local the disease may be. Thus, instead of the eruption coming out over the whole forehead it may affect only a narrow vertical band passing upwards from the root of the nose, or, in another case, the temporal region just above the outer corner of the eyebrow may be deeply scarred, whilst scarcely any scars are seen elsewhere. These facts favour the belief that the eruption is sometimes due to irritation, beginning in small nerve branches, after their subdivision, rather than in the chief trunks or in the centres. See page 185 for facts in the opposite direction.

All of them confirm my previous impression, that, excepting in aged persons, after-pains are not common.

Case XXXIV.—*Herpes Frontalis* (*slight*) *on right side—No inflammation of the Eye.*

J. Bayly, æt. 49, a healthy man, a printer, applied at the Hospital on May 31 with the scars of a very slight attack of herpes on the right forehead and upper eyelid. It had first appeared five days before, and had been very mild. There was

a little irritation before it came out, but not much. The distribution of the eruption was very definite. The principal line of vesicles ran straight up from root of nose on right side of median line. None on temporal region of forehead, and none on side of nose. A group on upper lid. At present the eye is simply watery and irritable.

Case XXXV.—*Herpes Frontalis, with an abortive patch near the tip of the Nose—Iritis and ulcer in Cornea.*

Ann Ward, æt. 28, was sent to me by Dr. Forshall with the statement, "Inflammation of skin and cornea; iritis; no history."

She had a few scattered scars of herpes on the right forehead, extending into the scalp. Near the tip of the nose was a red patch, where, she said, some spots had threatened, but had never been fully developed. All traces of iritis had now disappeared. There was a single pustule near the upper margin of the cornea. This pustule was probably recent, and not herpetic. She told me that the eruption had come out suddenly three weeks ago, with a great deal of pain. The eye had inflamed afterwards.

Case XXXVI.—*Herpes Zoster Frontalis in the right side—Irregular distribution—No inflammation of Eye.*

Dec. 8, 1868. Anne Bayes, æt. 26, attended at the Skin Hospital with diffuse eczema of the scalp, and with also the deep scars of herpes frontalis on the right forehead. The scars were unusually deep and large, but, fortunately, they were only few in number. The chief group was in a line with the eyebrow. Just beyond the outer angle of this there was an irregular patch almost as large as a shilling. Directly above this, to the outer side of the frontal eminence, there is another group of small ones. From the inner angle of the eyebrow upwards to the parting of the hair there was a line of small but deep scars. The frontal eminence itself, and adjacent parts, were quite free. There were no scars on the nose, and the eye was quite healthy. She complained a little of the itching feeling about the principal scar, but, excepting that, there was no pain.

Her account was that she had been attending at St. Bartholomew's, under Dr. Andrews' care, for eczema of the scalp, and had been under care for a month before the herpes came out.

During the attack of herpes she described an attack of very severe pain, such as to prevent her sleep, and oblige her to give up her place, and return home. The present eruption was merely common eczema of the scalp. She never had shingles before.

CASE XXXVII.—*Severe Herpes Frontalis of left Forehead—No vesicles on Nose, and no inflammation of Eye.*

A gentleman, æt. 24, was brought to me in July, 1869, with his left forehead covered with the scars of herpes. He was just recovered from a very severe attack. He had been attended by two medical men, one of whom had given the correct diagnosis, and the other had considered the disease erysipelas. The nose had not been affected, and the eye had wholly escaped. He still, at the end of six weeks, suffered much from neuralgia of the skin. He had but just left his room, having been very fearful of a relapse of "the erysipelas." We sent him to the sea-side, and assured him that he would never have any return of his malady.

CASE XXXVIII.—*Severe Herpes Frontalis, followed by partial Ptosis.*

On May 4th, a little girl was brought to me from Mr. Garman, of Bow, by whom she had been attended for severe herpes frontalis of the right forehead. The eruption had left numerous and deep scars, and some of the sores on the top of the head were still unhealed. There were a few small scars on the side of the nose, near the inner canthus. The child's mother told me that there had been no spots on the side of the nose lower down. The cornea was quite clear, and the iris active. The conjunctiva was still somewhat congested. The upper lid drooped, so as to almost cover the eye.

CASE XXXIX.—*Herpes Frontalis (severe)—Oculo-nasal not affected, and no inflammation of the Eye—Xanthelasma of Eyelids.*

Thomas Higgins, æt. 58, applied as an out-patient, under the care of Dr. M. Mackenzie, on account of pain and numbness in the right forehead.

I saw him on September 29.

On examining the forehead, a number of deep scars were seen over the whole of the right side of it, from the eyebrow to the hairy scalp, extending outwards as far as the line of the outer canthus and inwards to the middle line.

There was one scar in the middle of the upper eyelid, and an indistinct line, about half an inch in length, along the right of the middle line of the nose.

There were none close to the inner canthus.

The scars extended amongst the hair as far as the vertex.

Last Saturday three weeks the eruption came out. It had been preceded by some pain, but not to any marked extent.

The eye was closed for awhile, and he could not see, but if the lids were opened he then saw well.

He had perfect vision.

The scarred forehead was decidedly anæsthetic. He scarcely felt at all, though he felt well close up to its margin all round.

He had intense shooting pain, keeping him awake.

He was the subject also of a slight form of xanthelasma, to which the following note refers :—

On each lower eyelid there were small whitish-yellow spots a little elevated, looking like distended sebaceous follicles. On each inner canthus there was a whitish patch the size of the tip of the little finger.

The affection was more marked on the left than on the right side.

When young he was very subject to sick headaches, but had not been so of late years.

He was jaundiced some twenty years ago.

He is of pale complexion, but has good health. Seven years ago he was laid up with "ague and low fever."

I was indebted to Dr. Woodman for an opportunity of seeing this patient, and to Mr. Waren Tay for the above notes.

Case XL.—*Scars of Herpes Zoster of the left Forehead, six years ago.*

January 4th, 1869.—A young woman, who was attending as an out-patient under the care of Mr. Little at the London Hospital, attracted my attention by some conspicuous scars on the

left forehead. They were quite limited by the middle line, a series of them running along just to the left of this. There was another line along the margin of the hairy scalp, a group at the outer extremity of the eyebrow, and another at the inner. There were none below the level of the inner canthus. The eye was quite healthy.

Her account was that six years before she had been in very great pain in the forehead one night, and in the morning she saw an eruption out. It was called erysipelas. The spots disappeared in a few days, leaving these scars.

CASE XLI.—*Herpes Frontalis in a young Child—Ulcers on the Cornea previously existing.*

For the opportunity of seeing the subject of this case, I was indebted to the kindness of my colleague Mr. Hulke.

Rose Elliot, æt. 4, was brought to me by her father, at Moorfields, on October 4, 1869, with herpes frontalis on the left side of her forehead, and ulcers on the left cornea.

The eruption had come out about a week before her admission, and had been preceded for a few days by pain in the left side of the face.

She had been under care at Moorfields eight months before for "inflammation" of both eyes. The right eye recovered, but she left off attending before the left was well, and it had several times got better and then relapsed since she ceased attendance. It had been better before the eruption of herpes appeared, but became worse when the spots appeared on the forehead. The eyes became affected in the first instance after measles.

When first seen by Mr. Hutchinson, the herpes eruption had begun to fade; the vesicles were small, and none of them confluent. They occurred in three positions—

A vertical double line of vesicles extended from the root of the nose to the scalp on the left side; it went up to, but did not transgress, the median line.

Another small patch was seen about an inch and a half further outwards, over the outer angle of the orbit and near the scalp.

The third group, consisting of two or three small vesicles

occupied the outer part of the upper eyelid. Both eyelids of the left eye were œdematous and inflamed. There was considerable photophobia. The left cornea showed a general diffused opacity, and there were several small ulcers of recent date on its surface.

There were no spots on the nose or cheek, nor any to the right of the median line.

I am chiefly interested in recording this case because it illustrates a possible fallacy in the interpretation of the connexion between herpes frontalis and inflammation of the eye. In all probability the ophthalmia present was the remains of previous disease, aggravated, but certainly not originated, by the herpes. Without attention to the history the case might easily have seemed exceptional to the rule that if the nose escapes the eye does so also.

NOTES OF CASES.

By Robert P. Oglesby,

Assistant Demonstrator of Anatomy in Leeds School of Medicine.

Case I.—*Removal of the whole of the Iris in an Operation for Cataract.*

Peter S., æt. 78, suffered from double cataract. The eyes in other respects were quite healthy. The corneæ were bright, the irides healthy, and the pupils acted well. Tension was natural. The cataract had existed in the left eye for three years; in the right, for two years and a half.

The man was in good health. The left eye was selected for operation. The incision was made with a broad iridectomy spud. On seizing the iris, to perform iridectomy, I was astonished to perceive that at no part of its circumference was it attached, and that I was drawing the whole of it carefully across the anterior chamber towards the wound. I endeavoured to extract it entire, but in this I failed, as it separated at the point where the forceps had seized it. After removing the remaining portion, I extracted the lens in its capsule with the scoop. A slight quantity of vitreous escaped. The removal of the iris was not followed by any bleeding, leading me to believe that it was, at the time of the operation, free from any attachment whatever. Very little disturbance followed the operation, but I was disappointed to find, at the end of a week, only a slight amount of vision. Improvement has been very slow, and I doubt whether he will ever obtain useful vision.

Case II.—*Sudden Blindness—Rent in Choroid.*

G. J., a painter by trade, applied for relief on account of sudden failure of sight. One morning, four or five weeks before, while proceeding to his work, being then in the enjoyment of perfect vision, he suddenly exclaimed to his companion, "How foggy the morning has become," but his friend assured him that

the sky was clear, and the sun shining most brilliantly. He has never seen well since.

The right disc was much congested, and the arteries were very small. Immediately above the disc was a breach in the choroid. It was half-moon shaped, and of considerable extent. The left disc was very woolly, but the retina appeared healthy, and the vessels were normal in character. The vitreous was slightly turbid. He could read No. 20 Jaeger with either eye. The man failed to attend again.

Case III.—*Congenital Malformation of the Optic Discs—No Vision.*

Ann C., æt. 9 months, had been blind since birth. She was a healthy-looking child, and the parents could not account for her defect of sight by giving the history of any fall, blow, or illness. There was no syphilitic history.

In the left eye the disc appeared as the smallest speck, from which the vessels emerged. It was natural in colour, but not in shape, being, as it were, compressed, and divided by a sharp bridge. The veins were relatively larger in size than the arteries. The retina and choroid appeared to be healthy.

In the right eye the disc was represented by a leaden-coloured opacity of curious shape. After careful searching, only one small vessel could be traced emerging from it.

Case IV.—*Sudden Blindness—Floating Body in Vitreous—Centripetal Contraction of the Field of Vision.*

A young man, æt. 17, a mechanic by trade, enjoyed perfect vision till the twenty-fifth day of April, 1869. On that day he accompanied a regiment of soldiers from their barracks to church, a distance of one mile. The day was very fine, and the sun shone brightly, and as he gazed on the scarlet coats of the soldiers, he "felt his eyes sorely dazzled." As he continued looking at the soldiers the left eye suddenly "went blind." He at once ran home in great alarm to acquaint his parents about the matter. His mother, on examining the eye, was at once struck by the difference in size of the pupils, the pupil of the blind eye being very large.

On examining him three days afterwards I found that he was then, as he always had done, enjoying excellent health. His manner of living was extremely temperate, and he neither indulged in the use of spirituous liquors or tobacco. He had never suffered from syphilis. The loss of vision had not been preceded by any usual symptom, further than the extreme distress he experienced while looking at the soldiers. The pupil of the diseased eye was very large, while its fellow was slightly contracted. The irides were free from disease. There was no increased vascularity of conjunctiva, neither was there intolerance of light. Tension of both eyes normal. The pupil of diseased eye remained motionless when exposed to bright light, and would not act in concert with its fellow, but the pupil of the right eye acted readily.

Vision: left eye, shadows only; right, normal. The ophthalmoscope showed extreme congestion of the left disc, with large and tortuous veins. The retina and choroid appeared healthy. As the eye moved outwards, a large floating body crossed the field, in colour like a piece of fine crape.

Field of Vision.—There was great centripetal contraction of the field of vision in the left eye, its measurement being one inch and three-quarters by one inch and a half. He was ordered iodide of potassium in ten grain doses thrice daily.

Four days later he again visited me. I then found that the pupil was less dilated and would act slightly. Vision had materially improved, and qualitative as well as quantitative perception of light was moderately good. The film was decidedly less dark in colour, its apex being nearly transparent. There was no alteration in the appearance of the disc or the vessels. The field of vision had increased in size, measuring 5 inches by $4\frac{1}{2}$ inches. He was told to continue the iodide of potassium.

One week later vision had so far improved that he could read 4 Jaeger, and the film was barely perceptible.

On May 17 the condition of the left eye was as follows:— The pupil was normal. Vision, 1 Jaeger. Field of vision, normal. Film, not perceptible. Slight congestion of disc. Less tortuosity of veins.

The iodide of potassium was discontinued at the end of two weeks, when he reported himself well.

NOTES OF MISCELLANEOUS CASES.

By Jonathan Hutchinson, F.R.C.S.

(Continued from page 228.)

No. XLVI.—*Retinitis Pigmentosa supposed to be Congenital—Marriage of Consanguinity—Nyctalopia an ill-marked Symptom—Ophthalmoscopic Appearances.*

Samuel Bulley, now æt. 14, is believed to have been born with defective sight. At any rate, it was noticed at the age of 4 that he often ran against things, and did not seem to see well. It is not thought that he has got materially worse, but of this we have no accurate measure. He has often been deaf at times, but has now recovered fairly. He has been sent to school, but has scarcely learnt to read. From the earliest childhood it has been noticed that as soon as daylight ended he became almost blind, and he has been in the habit of going to bed as soon as artificial lights became necessary. He can, however, see by gas or candle-light if the light be good; it is only when the light is defective that he cannot see. By bright moonlight he sees almost as well as in the day time.

Vision in each eye $\frac{20}{100}$, and No. 4 Jaeger at 12″. He is hypermetropic a 14th, and with + 14 he sees $\frac{20}{70}$ even by candle-light.

The ophthalmoscopic appearances are almost precisely similar in the two eyes. In each the disc is pale grey (waxy), its margins indistinct, surface hazy, and vessels very small. Both *arteria* and *vena centralis* are greatly reduced in size, the artery so small in the right that it can with difficulty be traced. He is of rather fair complexion, and the choroid is thin. Its epithelial layer appears to be indistinctly marked with small whitish pits. The outlying portions of the retina are speckled over with pigment, arranged in beautifully delicate webs, like bone corpuscles, with uniting lines between them. Many specks of pigment are in front of retinal vessels. The pigment begins at a distance from the optic disc of about equal to three times its width, and then increases in quantity as we pass outwards. I cannot bring into

view any peripheral part of retina in which the pigment is not present.

His father and mother were first cousins, their fathers having been brothers. It is not known that defects of sight have been observed in the family before. They are from Plymouth. His father is very fair, his mother very dark. He takes after his father. There are five living in the family; all the others are healthy. He was himself quite healthy in infancy. His father had been for long ill before the boy's birth, in consequence of a fever; he remained nervous and not himself.

No. XLVII.—*Sudden failure of sight in one Eye in Conjunction with Paralysis of Third Nerve—Partial recovery of Third Nerve, and Slight Improvement in Sight—No cause assignable.*

Miss A., æt. 24, of good constitution, suddenly one afternoon in February last found her left eye fail, and had a pain in the forehead. The pain crossed the forehead and was chiefly produced in moving the head.

The pain lasted for three weeks. The globe ached and the lid drooped. She appears to have had for a time almost complete paralysis of the third nerve. On the day before it begun she had been standing out of doors on a very cold day, but was not aware that she had taken any hurt.

Some three years ago she had a curious spasmodic affection of one leg, which lasted for a few months. The whole limb used to jump and twitch, and was somewhat weak. It is not weak now.

Within twenty-four hours from the beginning of the affection of the eye she was in "pitch darkness." At first it was only a little dim. Can now see 100 at 1′.

July 2, 1868. The eye is turned outwards; the pupil moderately dilated and fixed. She is unable to look upwards or downwards perfectly. Is improving both in sight and in movement of eye. The optic disc is white in all parts, and equally so in all. It is perfectly clear, and the choroidal margin distinct and perfectly round. It is in a state of almost absolute anæmia rather than atrophy. Both vena and arteria centralis are reduced in size, but the artery is proportionately much smaller than the vein. The artery can indeed only just be traced;

still it is traced definitely. There is no opacity of retina at any part. The fundus, excepting the disc, seems healthy.

It is quite certain that the failure was sudden, because when she first noticed it the eye was only dim.

What was the cause of the sudden failure of sight in this case? Not *embolism*, for the third nerve as well as the optic was affected, and the arteria centralis is still visible, whilst the disc itself is white. *Neuritis* is probable; but we must suppose the inflammation not to have descended so low as the eye itself, for there are no traces in the disc. We must suppose also that the third nerve was involved. It is very rare, however, for neuritis to involve but one side, and for it to implicate other nerves than the optic; also it is usual to have more severe general symptoms than were here present during the early stage.

The account of a former attack of partial paralysis of one lower extremity is very interesting.

No. XLVIII.—*Congenital Syphilis with destruction of Soft Palate—Absence of Malformation of Teeth.*

Joseph Jones, æt. 27 (April, 1868). He was treated by Mr. Dixon for interstitial keratitis (double) six years ago. He has so far recovered that he can read brilliant but there are dim central opacities in both corneæ.

Two years before his keratitis he had sore throat, and the uvula and part of soft palate have been destroyed. There is a large scar in the pharynx. His teeth are not materially malformed, nor his nose flattened. There are very marked radiating scars at the angles of his mouth. He has fairly good colour.

His case supports the opinion that the patients who are liable to ulceration of the throat as a consequence of inherited taint, are not those who show the characteristic teeth and physiognomy. It is also probable that the keratitis had not been precisely of the common kind, for it had left central opacities more like those from ulcers.

No. XLIX.—*Xanthelasma Palpebrarum—Severe, Hepatic Dyspepsia—Repeated attacks of temporary Blindness—Ultimate persistent Blindness of one Eye.*

The term xanthelasma has been applied by Mr. Erasmus Wilson to the yellow patches not unfrequently seen in the eyelids of middle aged or elderly people, and described by Addison under the name Vititigoid plana. I prefer Mr. Wilson's name, because it refers to one of the most prominent features (yellow colour) and involves no theory of relationship to any other disease still less understood. The affection in question not unfrequently comes under the notice of ophthalmic surgeons, but it is regarded as merely a disfigurement and not suited for treatment, nor involving any serious consequences.

I record the following case here, not on account of the skin disease, but because a very curious form of amaurosis attended it.

William Savage, æt. 45, of dark complexion. On the eyelids of left eye are three patches, one at outer canthus, one above inner one, and a third below it. On the right lids there is a very small one at outer canthus, corresponding exactly with that on the opposite side, but there are no representatives of those on the upper and lower lids. The three patches on left side are all of some size, oval, $\frac{1}{3}$ of an inch long, or more; that on right is a mere speck. They present the usual characters.

He states that he has suffered much from his liver and indigestion. He has been very liable to sick headaches. Eight years ago he was under Dr. Gull's care for indigestion and thought he was in a consumption. Was so weak that he could not work, pain in head, &c. He has long been accustomed to take medicine for his stomach. He takes aperient medicine to prevent sick headaches, but his bowels are not usually costive. His headaches make him giddy. He has never had jaundice. Has had rheumatic fever three times.

The first attack occurred about eight years ago. He believes that the eyes were equally good up to date of last attack, for which he now attends.

Pupils sluggish; right the more so; of equal size.

After the last attack he had headache, "great pressure on the head." His headaches vary much in position, sometimes it is all on one side, sometimes only a small patch is affected.

L reads brilliant easily.

April 19, 1869.

History of Eye Symptoms.—Last Saturday fortnight he was in good health. At his work he found a cloud coming rapidly over the right eye, and in a minute or two was quite blind in it. He had often had similar attacks, but they had never lasted more than a minute or two. Two or three times both eyes have failed, and he has been for a minute or two in total darkness. After these attacks he has usually had a sick headache follow. In a general way only one eye has suffered at a time, sometimes one, sometimes the other, the right the oftener.

No. L.—*Coloboma of the Iris upwards and outwards.*

A little girl, æt. 7 (Annie Cordeaux), is the subject of an unusual malformation of the right eye. There is a coloboma of the iris upwards and outwards, and opacity of the lens. The coloboma has a width of about a quarter of an inch, and includes the ciliary as well as the pupillary part. In the sclerotic, a little above it, is a blot of dark brown pigment, at first sight suggestive of an iridectomy, but probably resulting from a congenital imperfection of sclerotic.

No. LI.—*Myopia of one Eye only, ending early in Blindness.*

A young woman, æt. 21, came on account of absolute blindness of her left eye. It had been weak for long, but the final loss of sight was only of six weeks' duration. Her right eye enjoyed perfect sight. Her left globe was much elongated, and on examination we found advanced myopic changes in the fundus, a large staphyloma, &c. It is of interest as an example of myopia advancing to its last stage in one eye, whilst the other eyeball remained of normal length.

No. LII.—*Inherited Syphilis falling with greater severity on a younger child.*

Inherited syphilis usually falls with greatest severity on the child born nearest to the date of disease in the

parent. An interesting exception to this rule is presented in the following case:—

A man brought both his children, girls, on account of interstitial keratitis. The younger, æt. 9, presented a very characteristic physiognomy, and teeth. In her the keratitis was just commencing. She had a prominent forehead from hydrocephalic tendency in infancy. Her elder sister, three years older, showed very slight peculiarities of physiognomy, and her teeth were perfect. She also had keratitis just commencing.

No. LIII.—*Congenital difference in colour of the Irides—Soft Cataract in one whilst the other remained quite free.*

George Derrick, æt. 36, in good health, applied at the Ophthalmic Hospital, in August, 1869. He had discovered quite recently that he could not see well with the left eye. It had been noticed also that there was a cataract in the eye.

The whole lens was slightly opaque, and had probably been so for some months. The iris acted well. To myself the chief point of interest was in the very dissimilar colour of his two irides. That of his right eye was grey, with much yellow and brown pigment, and that of the left a blue grey, without a trace of brown. He told me that his sisters had often mentioned to him that his eyes were odd ones. He had not himself ever observed any difference in their sight. He was quite aware that they differed in colour. Thus, the case confirms an opinion which I have formerly expressed, that when the colours of the two irides are markedly different, not unusually ulterior changes follow, or marked differences in accommodation are present.

In this instance I was quite unable to inspect the fundus of the eye, as the lens was too opaque. The cataract is of blue-white tint.

No. LIV.—*Congenital (?) Paralysis of the Third Nerve.*

Mr. Eaton, of Ancaster, Lincolnshire, sent to me a young woman who suffered from congenital (or infantile) paralysis of one third nerve. Her right eyelid drooped so as almost to cover the cornea, and she had no power of elevating it. The eye looked outwards, and she could scarcely bring it into a straight position. She could not turn it inwards in the least, nor could

she elevate or depress it. Slight rotation (superior oblique) occurred when she tried to look downwards. The external rectus acted vigorously. The pupil was of medium size, and acted a little, but only very sluggishly. Thus, it seemed probable that the radiating, as well as the circular, fibres of the iris were involved in the paresis. She could read No. 4 at 1′ and $\frac{2}{7}\frac{0}{0}$ in distance. Both eyeballs were hypermetropic in low degree. The fundus of the divergent eye was normal in every respect. The patient, whose age was 21, stated that she had been in her present condition as long as she could remember, and that her mother said that she had been born so. I declined to undertake any operation. It might have been practicable to relieve the ptosis, but this would only have exposed the divergent globe more, and not improved her appearance.

Making allowance for a degree of hypermetropia, which it was not easy to measure accurately, there is no doubt that the divergent eye possesses almost full accommodation.

No. LV.—*Liability to very severe Headaches—Failure of one Eye after parturition, and on a second occasion failure of the other also—Ultimate Blindness—History of a temporary Blindness in both Eyes after parturition twenty years ago.*

Mrs. C. Nickerson, æt. 42, from Eastbourne, applied to me when blind of both eyes from atrophy. I found both discs abruptly margined, quite clear, and free from lymph, and of a grey white. They were depressed by atrophy. The vessels were almost of normal size, the arteries somewhat diminished, but the veins not increased.

Mrs. N. was a pale, unhealthy looking woman, the mother of nine children. She stated that, in a general way, she had enjoyed good health. After her first confinement she had "overflow of blood to the head, and was totally blind for a day." She was bled and leeched, and in a few days she regained her sight, which, after a while, became perfect again. On this occasion she was for a time insensible. This was twenty-two years ago. From that time until four years ago she had no defect of sight. She has experienced two severe nervous shocks, and had much trouble.

Her present ailment began four years ago. She had a cross-

birth and a very bad confinement, during her recovery from which she found her left eye very defective. She was exceedingly weak at the time, so that she could scarcely walk. Her surgeon advised her to wean the baby, and this she did when it was four months old. In about two years from the first failure her left eye was blind. She was confined again two years ago, and after this confinement her right eye failed rapidly. It had begun to fail before, but had not advanced far. Her right failed, as the left had done, very slowly. For the last two months she has been in her present condition, unable to count fingers, and barely seeing the largest objects. Mrs. N. gives the history of liability to most violent headaches. She had never been liable to them before her first confinement; but after the illness above mentioned (insensibility and blindness) they came on, and she has never since been wholly free from them. She describes these headaches as having been of terrible severity. They usually lasted about twelve hours, and were attended by sickness. During the time that the left eye was failing, the headache was over the left eyebrow. Latterly, whilst the right has been failing, she has had no pain whatever in the left, but only on the right side. The headaches have usually recurred once a week, but the hemicrania, during the progress of the amaurosis, was more persistent.

For twelve years Mrs. N. has been liable to attacks of psoriasis, and has several times had the eruption out very freely indeed. It came out worst in the early months of each pregnancy, and again during lactation.

She has never had any positive paralysis, but has suffered much from aching in her limbs, especially in the left thigh. She thinks her left lower extremity is weaker than the other, and also, though in less degree, her left arm. Hearing, taste, and smell perfect. Memory excellent. Her headaches lately have been very bad indeed, so that "she has thought she must go out of her mind."

Her pupils are large, but not motionless.

No. LVI.—*Syphilitic Choroiditis, Symmetrical; and causing complete Blindness.*

I have never seen a case of choroiditis at all parallel to the one which I have now to relate.

James Smith, æt. 31, came under my care at Moorfields on September 27, 1869, complaining that his sight had failed gradually from January to June of the present year. He had been discharged from the army on account of blindness. He had never been abroad, and was stationed at Canterbury when the disease began. He considered himself in good health, but he had a sallow faded-leaf complexion. He had bare perception of light and shadow.

He had a chancre in 1860 (nine years before admission) and was salivated for it; but he was under treatment only about a fortnight, and did not seem to have had any secondary symptoms. In 1868 he lost part of his uvula and soft palate, but had no other tertiary symptoms.

Examination of the Eyes.—The pupils were rather small, and the *irides* very sluggish. Under atropine they dilated and remained circular, but on careful inspection a few traces of pigment were discovered on the capsule of the lens in each. The *vitreous* in each eye was hazy, and although but few distinct flocculi could be seen, the haze was sufficient to interfere very much with the inspection of the fundus. The floating films were more abundant in the right than in the left. The condition of the *fundus* was almost exactly the same in each eye. The *discs* (which were seen with difficulty) were rather pale, but not remarkably so; and the central artery and vein were much diminished in size. Near to each *yellow spot* there was a conspicuous, large, straggling patch of grey-white colour, the nature of which was not very clear; it seemed to be a deposit upon the choroid. It was not pigmented. The *choroid* in other parts was covered over with coal-black patches, which were especially abundant towards the periphery (choroiditis-disseminata).

The case was clearly one of symmetrical choroiditis of very unusual extent, and producing the very unusual result of entire blindness. Taking the disease of the throat into consideration, there could be no doubt that the disease was syphilitic. This diagnosis was confirmed by the combination of conditions found in the eyes—the deposit of pigment on the anterior capsule, the opacities in the vitreous, the choroiditis. No doubt the extinction of sight depended chiefly on the large patches of effusion which had occurred near the yellow spots.

We may note that the tertiary phenomena of syphilis are but rarely symmetrical, and that the common form of syphilitic choroiditis very seldom causes absolute blindness, although it often impairs sight greatly. It is also of interest to observe, as regards the history, that although there could be no doubt as to syphilis, the man, as far as he knew, had never had secondary symptoms.

No. LVII.—*Purpura* (*one month*) *with Bleeding Spots on the Eyelid* (*one week*)—*No disturbance of General Health.*

The following case is as much of medical as ophthalmic interest. It was, however, the local symptoms which had claimed attention, and they certainly were, at first sight, somewhat alarming.

Sarah L. Baker, æt. 4, a healthy and remarkably vivacious child, with fair hair and skin, was brought to Moorfields on October 4, 1869, on account of some large bleeding spots inside the right lower eyelid. The eye had become slightly sore about a week before admission, and two or three spots appeared soon after inside the lids.

About a month before admission the mother noticed a sudden eruption of small red spots, which she thought were flea-bites, on the child's neck and shoulders, and in a few days they spread to other parts, so that before long only the scalp remained quite free from eruption. The spots were most numerous on the neck and back, where they were quite thickly placed; there were only a few on the hands, feet, and face, while they were moderately abundant on the limbs. A number of bruises appeared on various parts of the skin about the same time, and without apparent cause. Two warts also sprung up, one of which (a small one on the right upper eyelid) had since disappeared, but the other (on the right knee) remained of considerable size, and had bled somewhat freely when the child fell and scratched it.

This eruption was not attended by any other symptoms, and the mother knew of no cause.

The child had measles last May, but recovered perfectly. None of her brothers or sisters had had an eruption like this one, but one was at the same time under care at Moorfields with corneal ulcers and eczema.

On admission the ears and scalp were the only parts quite free from spots. The spots were very numerous on the shoulders and neck, some few passing to the upper part of the neck among the hair, but not fairly on to the scalp. The spots were less numerous on the lower part of the back and on the front of the body, and comparatively sparse on the limbs; on the hands and feet only a few were seen, and they were for the most part ill-marked; they occurred on both surfaces of the hands and feet.

Inside the right lower eyelid near the outer canthus was a spot of purpura of comparatively large size; its surface was slightly raised above that of the surrounding conjunctiva, and blood oozed from it.

Several well-marked spots were seen inside the mouth, on the hard palate and buccal mucous membrane.

No. LVIII.—*Xanthelasma Palpebrarum—Amaurosis of Right Eye—Commencing Locomotor Ataxy—Alopecia of Scalp, Trunk, and Limbs.*

Joseph Pieri, æt. 57, an Irishman, had lived thirty-eight years in London; married, the father of fifteen children; had been a moderate drinker, and had never smoked; he was pale but in good general health; no liver complaint, no headache; he had known of the *Xanthelasma* spots on his eyelids for only about six months.

The *sight* of the left eye had been lost for many years, and that of the right for nine years. The sight failed in about six months without pain.

For about three years he had been liable to sharp shooting pains "like lightning," in various parts of the limbs and trunk, never in the head. He called the pains "Rheumatism."

About sixteen years ago he began to lose the hair of his scalp in patches; in six months he had lost nearly all the hair from almost all parts of his body and extremities.

The inner extremity of each eyelid, and the side of the root of the nose, was dotted over with yellowish spots of various sizes, the largest the size of a split pea, the smallest a pin's head; all were elevated, and in the centre of nearly all was a black point, apparently the choked orifice of a sebaceous follicle; some of

the larger are yellow, flat, and level, without any orifices, and in every respect characteristic of Xanthelasma. The majority of the spots were situated to the inner side of the eyelid on the side of the nose. There were several, however, on the eyelid. Those below the level of the canthus were very small. The disease was remarkably symmetrical with a few slight variations. He stated that he did not know what a "sick headache" was, and had never had headaches of any kind. The only symptom which seemed referable to the liver was pain darting across the lower part of the chest; this pain was very frequent, lasting often not more than two or three minutes at a time; he had suffered sometimes from flatulence.

He appeared to have had a perforating ulcer of the left cornea, and had had iridectomy performed seven years ago. He was then told that he had "amaurosis" of the right eye. On admission the right disc was found atrophied. The right pupil was small and motionless, and did not dilate in the dark. He had on admission only the barest possible perception of light, and cannot find a gas flame.

The symptoms of locomotor ataxy consisted in sharp darting pains "like lightning" in various parts of the limbs and trunk, never in the head. These pains were very severe indeed at the time, never lasted more than a few minutes; in walking he was often obliged to stop for a while on account of the sudden sharp pain in his limbs. He had no defect of sensation in his fingers, nor any weakness in his legs, but his gait was uncertain, and he stated that he would often fall if he were not very careful to catch hold of supports.

The hairs of his scalp and eyebrows were almost entirely absent, only a few scattered white ones remaining. At the time the alopecia began he had no symptoms of illness.

This case is of some interest in association with No. XLIX, in which also curious nervous phenomena had occurred in association with Xanthelasma. For the present I shall abstain from any further speculations as to the cause of the simultaneous production of this singular group of symptoms. I shall be greatly obliged to any medical friends who can afford me opportunities for investigating other examples of Xanthelasma palpebrarum.

AN ACCOUNT OF SOME PATHOLOGICAL SPECIMENS RECENTLY EXAMINED.

By Mr. J. B. Vernon, Curator to the Hospital.

[* Those marked with an asterisk have been preserved in the Museum of the Hospital.]

*A Foreign Body embedded in a Blind Eye for twelve years without any mischief to the other Eye.

In April, 1868, Mr. Critchett removed the right eye of J. J., which had been blind for twelve years, after an injury by a chip of metal. The eye had become painful during the previous few weeks only, but the fellow-eye had never at any time been affected.

The globe was very soft; an old and opaque scar occupied the inner half of the cornea; the iris was entangled in the scar tissue, and there was no anterior chamber. The lens was not to be found. The vitreous chamber was filled by a white thready substance, like soddened connective tissue, to the naked eye, and consisting, when examined with the microscope, of irregular meshes of connective-tissue fibres containing numerous cells, some of which were nucleated, others spindle-shaped, mixed with pigment and fat granules. In the midst of this tissue was a rough fragment of brass, which still retained some of its colour and fresh appearance.

The coats of the eye were in their normal positions, but the retina could in some places with difficulty be distinguished from the tissue in the vitreous chamber, and seemed to have been changed into a yellow layer of a fibrous nature very intimately connected to the choroid on the one side, and to the hyaloid membrane on the other; all traces of its nervous structures had been destroyed. At the time of the operation a hard substance was felt in the anterior part of the eye, which was thought to be a mass of chalk or a new formation of bone.

*Wound in the Ciliary Region—Sympathetic Irritation after an interval of twenty-five years.

In May, 1868, Mr. Couper removed the right eye of W. F., æt. 51 years. Twenty-five years previously, the eye had been

wounded by a fencing foil, a part of the foil seems to have remained in the eye for a time and was then extracted. The sight was at once completely lost. Occasional attacks of neuralgic pain and considerable difficulty in reading with the left eye induced him to apply to the hospital, and, except some tenderness when touched, nothing, he said, had ever called his attention to the injured eye.

The eye when removed was very soft and much reduced in size. Almost the entire cornea was opaque, and the ciliary region at the outer side was puckered by an old cicatrix; within the eye this part was much thickened by dense white scar-tissue, and it was evident that the ciliary circle had been completely cut across at the time of the accident. The retina was completely detached, and was separated everywhere from the choroid by a coffee-coloured fluid which contained cholesterine in large quantities, and which seemed to derive its colour from abundant pigment cells and broken-down blood. No traces of the lens remained, and the vitreous humour was reduced to a mere thread of fibrous tissue, which could hardly be distinguished from the wasted retina which surrounded it.

Two or three twigs of the ciliary nerves were to be seen running up to the mass of fibrous tissue which formed the scar.

At the time of operation the left eye was rather painful, constantly watering, and showed a well-marked zone of ciliary congestion.

**Foreign Body passing through the Eyeball and becoming embedded close to the Optic Nerve, and causing very extreme Irritation.*

Mary Renshaw, æt. 11 years, was amusing herself by exploding some percussion caps by striking them upon a stone; a splinter struck her left eye and she was brought to the hospital two days afterwards with a small cleanly-cut wound in the outer margin of the cornea, partial division of the iris and an opaque lens, and suffering very much from photophobia and ciliary pain. On November 13th, 1868, on the occasion of her second visit to the hospital, as her distress was not at all relieved, Mr. Bowman performed an iridectomy and removed the softened lens with a syringe. No foreign body could be detected. This operation produced very slight alleviation of the pain, which at times was

evidently very severe. On November 27th, Mr. Lawson removed the eye. There was more difficulty than usual in completing the operation and detaching the globe, the tissues behind it being very solid and resisting. The entrance of the optic nerve was surrounded by a firm fleshy substance which had made the division of the nerve more troublesome. A portion of similar material was left behind in the apex of the orbit.

No foreign body was to be found within the globe, but an opaque streak passed through the vitreous humour corresponding to the wound in the cornea and iris in front, to terminate at a small pin-hole aperture in the coats of the globe immediately to the inner side of the optic nerve entrance. At this spot a small quantity of blood had separated the retina from the choroid. Outside the sclerotic, exactly corresponding to this perforation of the coats, in close contact with the optic nerve and embedded in the fleshy substance above mentioned, the fragment of metal was found.

The fleshy growth which surrounded the foreign body was very vascular, and was evidently a new formation of granulation-tissue consisting almost entirely of pale nucleated cells, with a very scanty intercellular matrix and many capillary vessels.

The removal of the eye was followed by very free suppuration within the orbit, and complete cessation of all the child's suffering.

**Gun-shot Wound of the Eye, involving the Ciliary Region—Sympathetic Irritation of the other Eye.*

James M., æt. 26, on Christmas-day, 1867, was loading a double-barrelled gun, which exploded without any very obvious cause. The left side of his face and head were much injured, and his left eye became almost completely blind. On May 1st, 1868, he applied to Mr. Bowman on account of occasional very severe pain in the right eye. The injured eye retained a bare perception of light, but its fundus could not be illuminated.

The injured eye was removed; it was soft (T − 1); the cornea was clear, but the pupil was displaced by the iris having been drawn inwards to become entangled in a scar in the ciliary region, as though an iridectomy had been performed.

On opening the eye the retina was found detached, except on

the inner side, where a cicatrix united all the coats together. The scar extended from the wound in the ciliary region in front —the entrance wound—to another wound in the sclerotic at the equator, through which it seemed probable that the shot had left the globe.

Wound of the Ciliary Region—Sympathetic Irritation of the other Eye.

Isabel Turner, æt. 22 years, was struck in the left eye with a piece of a tobacco-pipe from a toy-gun in January, 1868. The sight of the eye was at once destroyed. The vitreous humour seems to have escaped, and there was very free bleeding at the time. The eye became much shrunken, but did not trouble her for some months. In May, 1868, she applied to Mr. Streatfeild on account of very severe neuralgia in and around the globe, and so much weakness in the other eye, that at times she was quite unable to do any work. This (right) eye was rather tender, its ciliary vessels were very much injected, and the pupil was rather inactive.

The remains of the injured eye were removed on May 4th. The entire cornea was opaque and much puckered by a cicatrix involving the ciliary region. The retina was detached, shrunken, and opaque, and was torn away from its junction with the optic nerve. A small quantity of clear yellow fluid separated it from the choroid.

Wound in the Ciliary Region—Rapid Sympathetic Irritation of the other Eye.

James Eyre, æt. 26 years, came to Mr. Lawson, May 19th, 1868. The day previously the front of his right eye had been lacerated by a large, rusty nail. Some vitreous humour had escaped, for the eye was smaller and softer than its fellow, and was very painful, and had lost all perception of light. The cornea and ciliary region were traversed by a ragged wound, and the anterior chamber was filled with blood.

In a week from this time, the symptoms were not in any way relieved by treatment, and he now complained of weakness and watering of his left eye.

The injured eye was removed on this his second visit. Some vitreous humour and portions of the lens escaped from the wound during the operation. The retina was detached from the choroid by recent hæmorrhage. After the operation he had no further annoyance.

* *Punctured Wound of the Eyeball from above, involving the Ciliary region and causing irritation of the other Eye.*

On May 21st, 1868, Mr. Hutchinson removed the right eye of Harriet Chapman, æt. 35 years. Five weeks before her coming to the hospital, she had fallen upon a dinner-knife while running upstairs; the point of the knife—a very sharp one—cut through the eyebrow above the upper eyelid and entered the globe. All vision in the eye was lost at once, and for a day or two she had some pain in it, and in less than a fortnight she felt occasional pain, and dimness of vision which increased in the other eye.

When removed the globe was soft, the cornea was transparent except where a scar ran across it over the pupil and involved the ciliary region at each extremity, the iris was adherent to the back of this scar, and the anterior chamber was lost. At the upper and posterior part of the globe, just above the optic nerve, was another scar in the sclerotic, about half an inch long, to which the soft tissues of the orbit were closely adherent, as though the point of the knife had emerged from this spot.

The lens had probably escaped at the time of the accident, no traces of it remaining. The retina and choroid were entangled in the cicatrix in the sclera posteriorly, but elsewhere the retina was separated from the choroid by a yellow curd-like substance, which appeared to be discolorized blood.

Wound of the Ciliary region, prolapse of Iris, Sympathetic Inflammation, Iritis, etc., in the other Eye.

On June 11th, 1868, Mr. Couper removed the right eye of Harriet Lane, æt. 11 years.

On May 4th her eye was struck by a stone, and she presented herself with a wound of the cornea and a prolapse of

the iris, which was covered with lymph. An opaque grey mass was to be seen deeply-seated in the eye. The prolapsed portion of iris was removed.

The left eye was congested, and at times pained her. The iris was discoloured and thickened, its fibrous appearance almost lost, the pupil very sluggish even under a strong solution of atropine. The posterior layer of the cornea was dotted with small opaque spots. The vision with this eye was $\frac{20}{50}$ (Snellen).

No remains of the lens were to be seen when the eye was opened. The vitreous humour was clear, but of a yellow colour. A firm white cicatrix occupied the inner aspect of the ciliary region, the iris being adherent in it, and the ciliary processes having been completely cut through.

An iridectomy was afterwards performed with beneficial effect upon the left eye.

Tumours and New Growths, etc.

* *Cysticercus-cellulosæ behind the Upper Eyelid.*

Anna B——, æt. 7 years, was brought to Mr. Streatfeild, on July 4th, 1868, on account of a swelling beneath the right upper eyelid, which her mother had observed for six months, and which was said to be gradually increasing in size.

The eyelid was prominent and drooping, but not red or swelled. On examination it was found to be quite natural, but was pushed forwards by a swelling of the conjunctiva above and rather to the inner side of the eyeball. The swelling was about the size of a nut, very movable, and when pressed could be pushed back into the orbit, to re-appear when the finger was removed, its surface was quite smooth. The movements of the eyeball were not interfered with, and the vision of the eye was perfect. There was some conjunctivitis, and this was said to be habitual.

The cyst, for such it was considered to be, was readily removed. When opened there escaped a small quantity of thin puriform fluid, in which floated a small clear vesicle about the size of a pea. The cyst had thick walls which were lined by a smooth membrane, and seemed to be formed of layers of dense connective tissue. The vesicle which it contained had

transparent walls, except where a dull, white spot marked the position of the head of the hydatid.

** Cysticercus-cellulosæ beneath the conjunctiva at the inner angle of the Eyelids.*

Mary L——, æt. 5 years, was brought to Mr. Wordsworth, April 28th, 1868, because her mother had noticed a swelling in the corner of the left eye, which had made its appearance during the last month, and was rapidly increasing in size, and causing some pain and inflammation of the conjunctiva.

Immediately beneath the plica-semilunaris was a semi-transparent globular swelling, about the size of a small hazel-nut, not very movable and firmly attached to the subjacent parts. There was some little difficulty in removing it, as its attachment to the sub-conjunctival fascia was thick and very firm. During its removal the tumour was opened, and there escaped a small quantity of pus and a beautifully clear cyst, almost transparent and without any opaque portion of its walls as in the last specimen.

Fibro-cellular Tumour surrounding the openings of the Lachrymal Ducts.

Clara F——, æt. 23 years, came to Mr. Streatfeild, April 27th, 1868, complaining of a growth which bulged from beneath the outer part of the left upper eyelid. Its surface when thoroughly exposed by elevating the eyelid was smooth and soft, not transparent, very movable, and giving the impression of containing fluid. It had been observed during the last six months.

The growth was easily removed with scissors, and without chloroform. It was soft and lobulated, having the appearance of yellow fatty tissue, with a network of firm white fibrous tissue. A more complete examination with the microscope showed it to be an ordinary fatty tumour, with a delicate framework of connective tissue fibres.

* *Fibro-cellular and Fatty Tumour with Hair attached, growing around the openings of the Lachrymal Ducts, associated with a Supernumerary Lobule of the Ear on the same side.*

——— ———, æt. 19 years, came to Mr. Wordsworth on account of a growth which projected from beneath the upper eyelid and between the junction of the two eyelids on the right side. The growth was very firm and not very movable, and its surface was smooth and even. From its most prominent margin there were projecting some ten or twelve very fine dark hairs about the length of ordinary eyelashes.

Attached to the right cheek, immediately in front of the lobule of the right ear, was a small fleshy growth, hanging by a thin but very firm pedicle, apparently a rudimentary lobule to the ear. Both this and the growth in the orbit were removed at the same operation.

The supplementary lobule consisted of firm, condensed fibrous tissue, and its pedicle, at the point of attachment to the cheek, contained a thin plate of fibro-cartilage. The growth from the orbit contained a good deal of fat, but consisted principally of fibrous tissue, more so than the last specimen. The fat cells contained very beautifully-marked feathery crystals of margarine.

A collection of small Cysts removed from the Plica-semilunaris.

Jane Benson, æt. 24 years, came to Mr. Dixon, June 28th, 1868, on account of a swelling at the inner angle of the left eyelids. On examination it appeared that the conjunctiva on the inner aspect of the eyeball was much thickened and irregular, and dotted with small vesicles. The vesicles and the surrounding conjunctiva were snipped away with scissors. There were five cysts in all, the largest of the size of a small pea, the least no bigger than the head of a pin; their walls were perfectly transparent and their contents were clear and colourless, and without cells of any kind which could be recognized with the microscope.

On June 24th, Mr. Hutchinson removed a small cyst of the size of a small shot, which was situated upon the conjunctiva at the outer aspect of the eyeball of a boy, the cyst walls appeared to be entirely supplied by one long and tortuous artery, which was accompanied by its corresponding vein.

* *Syphilitic Panophthalmitis, with other symptoms typical of inherited Disease.*

Oswald Currie, æt. seven months, was brought to Mr. Streatfeild in May, 1868, perfectly blind, and extremely ill and emaciated. He was said to have had a severe illness, with a red rash, when six weeks of age, during which his eyes had remained closed through swelling of the eyelids, and that he had never seen anything since.

There was well marked iritis in the right eye, with effusion into the anterior chamber, and general increase in size of the whole globe. The left eye was enlarged by distension and thinning of the cornea, and the whole ciliary region. The child was evidently in great pain, and continually rubbing its right eye, the child's body was covered with a scaly and papular syphilitic eruption, he could hardly breathe through his nose, the bridge of which had completely sunk in.

The child's mother was 25 years of age, she had been married seven years, and during that period had had four miscarriages, all at about the sixth month of pregnancy, and the child she now brought was the only child that had been born alive.

The right eye was removed to relieve the child's pain. It was slightly enlarged, and softer than usual, the anterior chamber was half filled with puriform material, and the lens, which was quite opaque, and the ciliary processes were surrounded on all sides by a whitish deposit which appeared to consist of *débris* of cells mixed with some recent hæmorrhage, posteriorly the retina was detached from the choroid by a large quantity of a similar substance.

Syphilitic Panophthalmitis.

On July 7th, 1868, Mr. Lawson removed the right eye of ——— ———, æt. 35 years, who had contracted syphilis twelve months before, which was followed by iritis, for which he was treated, in Dublin, by Sir W. Wilde with iodide of potassium and mercury. For the time he considered himself cured, but in January he found his right eye to fail him again, and being in London he applied to Mr. Bowman, who sent him to the hospital.

There was considerable effusion of lymph both in the anterior chamber and behind the iris, he had only just a bare perception of light, and was in constant pain, during the last few days also the eye had become considerably enlarged. A week later, when he came a second time to the hospital, he was suffering acute pain, there was extreme chemosis, and the whole cornea was opaque and softening. The eyeball, too, was so enlarged that it projected from between the swollen eyelids.

There was some difficulty in completing the removal of the eyeball, as the tissues of the orbit were matted together, and the contents of the globe escaped, they had assumed the form of a firm gelatinous yellow white mass of lymph in the centre of which was some softer material, with all the appearances of ill-formed pus. The retina and choroid were thickened and separated from each other by a thick puriform fluid; around the ciliary processes was some recent hæmorrhage.

**Suppuration of the Eyeball, simulating an Intra-Ocular malignant growth.*

—— ——, æt. seven years, a very precocious, healthy-looking girl, had been complaining for some months of pain in the right temple, and though she very often rubbed her right eye, no especial attention was drawn to it; at this time (November, 1868) she came with her parents from America, and was put under medical care in London; about three weeks after her arrival the eye became enlarged, prominent and very painful, the eyelids became swollen also, and an opaque substance was noticed behind the pupil.

Mr. Critchett saw the child with Mr. Bowman, the case was considered to be an intra-ocular growth, and immediate excision was advised.

The child was very nervous and sensitive, but did not seem in much pain; the eyelids were red and swollen, the eyeball rather prominent, the pupil dilated, very sluggish, and displaced inwards, behind the lens was an opaque yellow-looking mass, without blood-vessels on its surface, which seemed smooth and uniform in colour, the ciliary vessels were injected, and there was slight chemosis; the eyeball was rather hard, and its coats

were bulging on the inner side, hence the distortion of the pupil. This bulging of the coats of the eye from within was very marked after removal; the optic nerve when it was divided seemed healthy.

No tumour or growth of any kind was to be seen within the eye; the vitreous humour was completely changed into a mass of consistent pus, which was more tenacious and gelatinous where it was in apposition with the retina. The latter was thick and opaque, and very readily torn. The choroid was soddened, and everywhere infiltrated with pus, and on the inner side corresponding to the bulging of sclerotic, the pigment layer on its inner surface was entirely destroyed.

**Glioma of Retina, rapidly recurring after removal.*

On June 11th, 1868, Mr. Hutchinson removed the left eye of George Felton, æt. 3 years, on account of an intra-ocular growth. The child was pale and thin, and for the previous six months its mother had noticed a greenish reflexion from within the eye, which during the last week, had become very painful.

The cornea was steamy, the pupil dilated and fixed, but it was almost impossible to use the ophthalmoscope on account of the extreme intolerance of light. The tension of the globe was considerably increased, and it was very tender when touched.

After removing the eye, the cut end of the optic nerve looked so dark and enlarged, that Mr. Hutchinson removed an additional portion of it which appeared to be surrounded by a dark-red fleshy substance.

The lens and anterior portion of the vitreous humour had retained their transparency, but the remainder of the vitreous chamber was occupied by a yellowish-white thick material, which had completely destroyed all the coats of the eye posteriorly, so that their identity could not be established, and it was not possible to see where the optic nerve entered the eye, or where it had joined the retina within. The colour of the new growth, for such it was, evidently became darker, and as though blood-stained until it merged into the deep colour of the fleshy material above mentioned around the optic nerve in the orbit, or under the microscope. Those darker portions of the growth contained a large quantity of blood-vessels and extra-

vasated blood; the paler and anterior portion consisted of a collection of small round cells filled with nuclei, and a scanty intercellular matrix of very delicate fibres; there were very many free nuclei, and scattered here and there were large dark pigmented cells like small mulberries.

The entire retina was involved in the growth, but the choroid, except where it had been destroyed posteriorly, was unaltered.

The child remained well until October, when his mother noticed some swelling of the lower eyelid. On November 30th, Mr. Hutchinson divided the lower eyelid vertically, and removed a firm, fleshy growth, the size of a large walnut, from the orbit. It had very slight connexion with the surrounding parts, except at the apex, where it was with difficulty detached.

It was firm, pinkish in colour, with dark liver-like patches interspersed throughout it, and consisted of two lobes which had grown one upon the other. The posterior of these two was more vascular and darker coloured than the anterior. Under the microscope its main elements were the small uniform cells which had been so abundant in the original growth.

**Double Glaucoma—Extirpation of one Eye—Rapidly growing Sarcoma springing from the Sheath of the Optic Nerve—Repeated Recurrence after several Operations.*

John Shropshire, æt. 57 years, came to Mr. Streatfeild on March 2nd, 1868. Three years previously his left eye had become completely blind, after he had suffered all the typical symptoms of glaucoma, but he had not thought it worth while to have any medical advice. Three weeks previous to his coming to the hospital, the right eye had suffered in the same way; and when he had just a perception of light remaining he applied to Mr. Streatfeild.

An iridectomy was performed on the right eye, and was followed by an almost complete restoration of sight. The left eye, being quite blind, was removed. The lens was opaque; the retina was detached in the lower part by a good deal of fluid; the vitreous humour was much diminished in quantity; and, when examined by the microscope, contained very many cells and imperfectly formed fibres.

There was no appearance of a new growth in the eye. He wore an artificial eye for one day only, and discontinued its use because it pained him. The socket always discharged freely, and on June 15th, 1868, he came again to Mr. Streatfeild.

The vision of the right eye remained very good, and the iridectomy had completely relieved all the symptoms as far as this eye was concerned. The left eyelids, however, were very dusky and swelled, and on separating them the conjunctiva was seen to be pushed forward by a firm elastic growth behind it. The growth was easily and completely removed without much dissection, and with it a portion of the optic nerve, half an inch in length, was removed at the same time; it was about the size of an egg, very firm and elastic, and when a section was carried through it and through the portion of included nerve, it was evident that it had sprung from, and was attached to the sheath and to the soft tissues immediately around the optic nerve. The nerve-fibres themselves were wasted, but their termination was very distinct, and was very abruptly defined, and under the microscope the nerve-fibres appear converted into fat. The tumour itself consisted essentially of fibrous tissue, the fibres being pale, but in the firmer portions very well developed. There were patches of extravasated blood here and there, and, in some places, where the tumour was less firm, it contained a large number of cells and masses of pigment; many of these cells had long delicate processes, as though they were undergoing a change into fibres.

The disease has returned, and has been removed as completely as possible no less than five times, on two occasions. The actual cautery and caustic paste has been freely applied. The last operation was undertaken on January 25th, 1869.

CASES ILLUSTRATING THE RESULTS OF WOUNDS OF THE EYE.

By J. W. Hulke, F.R.S.

The following cases are good illustrations of some of the kinds of wounds which may be often seen at every large ophthalmic hospital. They show, amongst other things, how an apparently very slight hurt will sometimes be followed by the direst consequences; and, on the other hand, how good recoveries are sometimes made from desperate injuries. In the first case, the relief afforded by iridectomy was very striking. As a rule, the local use of belladonna, and the internal administration of sedatives (of which morphia and henbane are the best) with bark, where the patients are feeble, give better results than mercurials, and what is commonly known as an orthodox antiphlogistic treatment. In the 1st, 2nd, and 4th cases it was, from the first, evident that the eyes were lost.

Case I.—*Contusion of the Eyeball with a blunt Arrow—Five days afterwards acute Inflammation, with great Tension—Iridectomy for the relief of Pain, and of the other Inflammatory symptoms.*

A healthy little girl, æt. 3, was hit on the left eye by a child's brass-tipped arrow. Two or three drops of blood flowed from the corner of the eye, probably from the lid or conjunctiva, because the mother, a very intelligent woman, said that the appearance of the pupil and of the eyeball was not changed, and a surgeon who saw the child a few minutes after the accident, assured her that the arrow had not pierced the eyeball. Two days later the mother noticed that the pupil was square. The child at this time could distinguish large objects correctly. Five days after the wound the child began to scream. She was very feverish; the eye became very red and excessively painful. She was thought to have meningitis, and was very actively treated as for this, but, not improving, after a fortnight's treatment, her mother brought her to the Royal London Ophthalmic Hospital, October 7, 1868. The eyeball was then very hard, denoting a

great excess of intraocular tension, and it was very red. The anterior chamber was full of blood, which completely hid the iris. The cornea was dull, and all power of perceiving light was lost. The child cried much on account of very severe aching of the eyeball, and of the head, and she was very pale and wasted.

For the relief of the tension of the eyeball an iridectomy was done. On completing the sclero-corneal incision, a considerable coagulum was extruded, much larger than the normal anterior chamber could contain. At my next visit, three days after, the tension was normal, the cornea was bright, the child was free from pain, and cheerful. The redness soon disappeared, and she was quickly convalescent. The last note says—the cornea and the aqueous humour are clear, the pupil is widely dilated and motionless, the lens is slightly dull, and vitreous humour gives an opaque greenish-yellow reflexion.

Case II.—*Slight Graze of the Cornea—Ophthalmitis.*

A tall brunette, æt. 28, a cook, struck her left eye slightly with a blunt fork. She ran to a neighbouring hospital at once, where she was told it had not hurt the sight; and indeed she says herself that she saw well at that time. Redness and swelling, with great pain, soon set in, and, four days after the accident, when she came to the Royal London Ophthalmic Hospital, September 9th, 1868, there were marked signs of ophthalmitis and of extension of the inflammation from the eyeball to the cellular tissue of the orbit. The cornea was dull, and a slight superficial scratch on it, which had certainly not penetrated the anterior chamber, was the only trace of wound. The pupil was turbid, dilated widely, and motionless, and there was a deep-seated, yellowish-green glimmer behind the lens. The conjunctiva was very red and œdematous, and it exuded a copious, flocculent, mucous discharge. The eyeball was slightly protruded, and its mobility was much curtailed. The eye still retained good quantitative perception of light. She was very pale and feeble, and much worn by severe pain in the eye and head. Before coming to the hospital, she had been actively depleted and restricted to a very spare diet.

Under the local use of compresses, dipped in a warm infusion of belladonna, and the internal exhibition of sedatives and tonics, she made a quick recovery. The eyeball wasted and occasioned no further trouble.

CASE III.—*Penetrating wound of the Eye by a Redhot Splinter of Iron—Recovery with perfect Sight.*

A rivetter while at work was struck by a splinter of a red-hot rivet in his left eye, in which it remained sticking (about six or seven seconds as well as he could judge) until he pulled it out, in doing which it burned his fingers. The splinter was about $\frac{1}{2}$ an inch long, $\frac{1}{4}$ of an inch broad at one end, and it tapered to a point at the other end, which pierced his eye. Next morning, when he came to the Royal London Ophthalmic Hospital, August 29, 1867, a burned wound was seen at the extreme edge of the cornea, through which the aqueous humour was draining away, and corresponding to this there was a horned notch in the upper and in the lower eyelid.

Under the use of ice and a solution of belladonna, he made a quick recovery, but he was kept under observation till October. When next seen, in February, 1868, an inconspicuous mark on the eyelids, over which a speck, about $1\frac{1}{2}$ inch broad, at the sclero-corneal junction were the only remaining traces of the injury. He read No. 1 of Snellen's types correctly.

CASE IV.—*Penetrating Wound of the Eye by a Splinter of Iron—Ophthalmitis.*

A smith, æt. 32, had his right eye struck by a splinter of iron, which his mate took out directly with a knife. In a few hours violent inflammation set in, and he presented himself as an out-patient next day at the Royal London Ophthalmic Hospital, October 7, 1868. When the cornea was directed strongly downwards and outwards, a minute wound (in all other positions of the eye it was hidden by the upper eyelid) became apparent in the sclerotic about 5 inches distant from the upper and nasal border of the cornea. The iris was greenish (the other iris grey), and the pupil was cloudy. The visual acuity was much diminished—he saw things as through a dense smoke. The conjunctiva was very red and œdematous, and it exuded a copious, flocculent, mucous discharge.

At his next visit, three days later, the inflammation was more intense, and the sight of this eye was reduced to quantitative perception. After this the pain and hyperæmia slowly abated, and the eyeball wasted.

THREE CASES OF OPTIC NEURITIS.

By J. W. Hulke, F.R.S.

Case I.—*Double Optic Neuritis, consecutive on Intracranial Disease, probably Tubercular.*

A pale, rather under-sized lad, æt. 15, was admitted into Percy Ward, November 3rd, with inflammation of both optic nerves. His pupils were dilated and motionless. The ocular media were clear. There was not any externally visible congestion. Both eyes were quite blind. The optic nerves were swollen, and the venæ centrales were particularly turgid, but the nerves were not quite so opaque as in some cases.

He had always been a nervous, excitable child. His present illness began one year ago with vertigo, and with headache, which he described as a feeling of pressure on the back of the head. About this time his arms were very tremulous, and afterwards his legs became unsteady, so that he had some trouble in maintaining his equilibrium, which symptom still remains. His sight began to fail about the time that he first suffered from headache. His mother was healthy, and his father had lived to 70, but five brothers and sisters had died in early infancy.

In this case the disease is probably tubercular, and the reference of the pain to the back of the head, together with the evident want of regularity in his muscular movements point to the cerebellum as its seat.

Case II.—*Double Optic Neuritis, consecutive upon Intracranial Disease, probably Syphilitic.*

A farrier, æt. 34, was admitted into Forbes' Ward, October 16th, under Mr. Hulke's care, with double neuritis optica. His visual fields were much diminished, and his visual acuity was so blunted, that, with the left eye, he could only spell short words in No. 16, and with the right eye words in No. 20 of Jaeger's scale of types, which correspond nearly to 2-line Great Primer, and 8-line Roman type of English printers. The pupils were

large and sluggish. There was slight divergence of the optic axes, and a want of harmony in the movements of the eyes. He complained of severe pain through the temples, and of great weakness.

Both optic nerves were very swollen, and so opaque, that within the area of the nerve disc the arteria centralis was quite hidden, and the veins were much obscured, while the branches of the latter in the retina were conspicuous by their turgescence and by their tortuosity.

He stated that his illness had begun a year ago with violent pains in the forehead and temples, from which he had since then never been free. The pain was very severe and paroxysmal, and soon after its commencement he first noticed his sight defective. The defect was a dimness, which constantly increased; its intensity, however, varied sometimes very greatly in the same day.

The only previous illness which he remembered was a chancre with buboes, which did not suppurate, twelve years ago.

Since he has been in the Hospital he has become quite blind, very deaf in both ears, and much more feeble, so that he now walks with difficulty. He has also, on several occasions, had retching, which could not be fairly attributed to any error of diet.

The opaque swelling of the optic nerves, and the turgescence of the venæ centralis, have both much increased.

The diagnosis made is neuritis optica, consecutive upon syphilitic inflammation, producing gummy swelling of the dura mater or of the bones of the basis cranii, and the treatment has been the exhibition of iodide of potassium, of which, unfortunately the patient is not very tolerant.

Very likely we have here inflammation, advancing along the neuroglia from the optic chiasma or intracranial part of the nerve trunk between the chiasma and the foramen opticum, in relation with the syphilitic disease within the skull, and thence outwards along the orbital segment of the nerve trunk to its intraocular end. It is also very probable that obstruction of the cavernous sinus may be another factor of the optic neuritis.

Case III.—*Consecutive Double Optic Neuritis.*

A little girl, æt. 7, perfectly blind, was brought to the Royal London Ophthalmic Hospital, October 21st, 1868. Widely dilated

and motionless pupils were the only externally visible signs of disease.

The optic nerves were swollen and opaque, and the venæ centrales were obscured within the limits of the nerve-discs, while, in the transparent retina, they were seen to be distended and tortuous.

Her father said that she had always been healthy till five months before, when her present illness began with listlessness, then drowsiness, moaning in her sleep, and retching. These symptoms lasted about one month, during which she lost her sight, and then disappeared, leaving her seemingly in good health.

A month later the optic nerves were whiter and less opaque, their contours were ragged, the arteriæ centrales were very small, and the veins not too full, but still tortuous. In the further progress of this case the nerves underwent thorough atrophy, while the child's health improved, and she became relatively robust.

PART II.

A Periscope

OF

CONTEMPORARY OPHTHALMIC LITERATURE.

A NEW SERIES OF TEST TYPES.

Dr. John Green, of St. Louis, has laid before the American Ophthalmological Society a new series of test-types for determining the acuteness of vision. He says:—

"The letter prœven of Snellen are the acknowledged standard for this purpose; but they are somewhat imperfect both in plan and in the execution of the smaller letters. The defects in plan consist in the selection of letters which are not so uniform in size and character as is to be desired, and still more in the fact that the gradations of size in the consecutive numbers of the series are not uniform. Thus, the successive numbers CC, C, LXX, L, XL, XXX, and XX of Snellen give the very unequal series of ratios, 1-2, 7-10, 5-7, 4-5, 3-4, and 2-3. In a communication made to the Society in 1867 I exhibited a series of test-letters, of sixteen gradations of size, in which a constant ratio of 7–10, or, more exactly, ·7069, was adopted. This series included all the higher and lower numbers of Snellen, but differed from that standard in the middle of the scale, for which reason the proposed change could not be very warmly advocated, notwithstanding the evident correctness of the principle on which it was based. I have now to propose a new series of twenty-four numbers, bearing the constant ratio of ·795, and combining the advantage of regular geometric progression with the preservation of all the important numbers of Snellen.

"The following table shows this new series side by side with those of Snellen and Giraud-Teulon. The common ratio is found by the formula $x = \sqrt[3]{\cdot 5} = \cdot 795$ nearly.

Exact Series, ratio ·795.	Approximate Series.	Series of Snellen.	Series of Giraud-Teulon.
200	200	200	200
159	160		
126·4	126		
100	100	100	100
79·5	80	70	75
63·2	64		
50·	50	50	50
39·7	40	40	40
31·5	32	30	30
25	25		
19·8 +	20	20	20
15·75	16	15	15
12·5	12·5	12	
9·9 +	10	10	10
7·87	8	8	
6·25	6·25	7	7·5
		6	
4·96 +	5	5	5
3·93 +	4	4	4
3·125	3·125	3	3
2·48 +	2·5		
1·96 +	2	2	2
1·56	1·56		
1·24	1·25		
·98 +	1	1	1

"In the selection of letters for tests of vision it is most important to choose those which are most nearly uniform in size and character, and which are, at the same time, as little complex as may be in their formation. It is impossible, however, to invent even a small series of letters which shall be strictly equal in size and uniform in design; and experience shows that any series, however limited, may be divided into letters of easier and of more difficult recognition. Letters made up wholly or in part of oblique lines, and also letters in which the horizontal elements greatly predominate, are very unequally affected by different forms of astigmatism, and may, therefore, be advantageously rejected. Rejecting for these reasons the letters A B K M N R S V W X Y Z, there remain fourteen to which these objections do not apply, namely, C D E F G H I J L O P Q T U. Of these, the letters C G O Q, which are modifications of the circle, are smaller than the square letters of corresponding height and width, and, as a fact, we observe that they are less easily recognized. The letters C and G, F and P, D and O, also are less easily distinguished from each other than from most of the other letters. These minimum deviations from strict uniformity are, however, of no special disadvantage, for they afford us a

convenient means of drawing somewhat wider distinctions than if the letters were absolutely uniform. Thus, we designate any degree of vision by the size of the letters positively and accurately named; but if only the easier letters of the line are distinguished with certainty, we note the number with the addition of the minus sign; or if only one or two of the very easiest are made out, we note it by the next lower number with the addition of the plus sign.

"The form of letter adopted is that known to printers as Gothic, and each letter is drawn, as nearly as good proportion will admit, within a square; they are, on the whole, much simpler in construction, and more nearly equal, than any before published. The arrangement of the whole series upon a single sheet is a matter of very considerable convenience, especially when the tests have to be used in a room less than twenty feet in length. This is easily and satisfactorily accomplished by making the spaces between the adjacent lines proportionate to the height of the letters."

The same author has also devised a series of improved tests for astigmatism, both colour tests, and tests depending solely on the directions of lines. With regard to the first he says:—"It was only by making trial of transparent colours of great purity and brilliancy, illuminated by transmitted light, that I have succeeded in attaining results at all satisfactory. The best material for these tests seems to be thin paper, dyed of the requisite shades, and rendered nearly transparent by saturating it with clear white varnish or Canada balsam. The colours with which I have been most successful are carmine, red, and ultramarine blue. The red paper is best prepared by dyeing thin tissue or copying paper in an ammoniacal solution of carmine, and smoothing it by pressure while still slightly damp. When perfectly dry it is cut into strips or sections, according to the form of the diagram to be made, and mounted upon a plate of glass or a stretched piece of thin white muslin, and varnished. Blue tissue paper, of pretty good tint, may be purchased, but I have obtained a better by the employment of the finest ultramarine ground in oil, and thinned with clear white varnish. This is applied with a soft brush to paper previously prepared by saturating it with the same white varnish. When dry, the transparent blue paper is cut to the desired form, and mounted with the red upon the glass or muslin. A single coat of varnish upon the muslin back will heighten the transparency of the diagram, if desired. The tests thus prepared are hung in a window (not in the direct sunlight), and viewed from the opposite side of the room. The difference in tint observed in the different lines in cases of even very low grades of astigmatism is well marked, and will often attract the attention of persons whose appreciation of form and whose conception of distinct definition in the visual

act is inferior to their power of appreciating and discriminating colour. The form of diagram recommended consists of twelve radiating lines of either colour, of a width corresponding to No. C of Snellen's test-types, arranged like the spokes of a wheel, and separated by interspaces of the other colour."

The linear tests consist of a series of diagrams in which lines are so combined and arranged that the necessary inquiries are soon made and replied to, and that the determination of the presence and degree of astigmatism may be easily made part of every examination of the state of vision. It would be difficult to explain the figures in words; but they are all given, together with the colour diagrams and test-types described above, and with full instructions for their use, in the "Transactions of the American Ophthalmological Society (1869)." To this volume the reader must be referred for more exact information.

A NEW FORM OF CYSTOTOME.

Dr. G. Hay, of Boston ("Trans. of Amer. Ophth. Soc., 1869"), recommends a new form of cystotome for modified linear extraction of cataract. The shape proposed is such as would be obtained by first lengthening, to the extent of four lines, the stem of the ordinary straight instrument, and then by bending the lengthened stem at right angles to itself at a point four lines distant from its toothed extremity, and as if, in the bending, this extremity were moved in a direction the opposite of that in which the tooth projects. Owing to the position of the incision (says Dr. Hay) which intersects the outer convex surface of the sclerotic in a line about the length of the diameter of the cornea, and which lies symmetrically above the cornea, each of its extremities being only a short distance—from two-thirds of a line to a line—below the level of the top of the cornea, it is difficult and dangerous to introduce the ordinary straight instrument. If the cornea is not drawn down far, the lens is in danger of being dislocated by the instrument, the eyebrow preventing the handle from being sufficiently depressed to keep the point far enough forward towards the cornea. If, on the other hand, the cornea is sufficiently drawn down, then the strain on the eye may cause rupture of the zonula, with escape of vitreous, certainly a very unfavourable complication. The instrument used by v. Graefe is differently shaped, it is said, according as the right or left eye is to be operated on. The modification here proposed is simpler, one instrument serving for both eyes. It can be easily and safely manipulated, allowing the division of the capsule, without drawing the cornea down as far as is required in using the straight instrument.

(Perhaps the best cystotome for modified linear extraction is a simple sharp steel hook, mounted as a mere point on a platinum

or other flexible metallic stem, which can be bent at any angle, in accordance with the requirements of the case.)

CORNEAL SUTURES AFTER FLAP EXTRACTION.

Dr. H. W. Williams, of Boston, has presented to the American Ophthalmological Society (*Transactions*, 1869) statistics of forty-four additional cases, in which he employed his method of corneal suture after flap-extraction. Four of these cases were still under treatment at the time of the communication, but in all of them a good result seemed to be already secure, the corneal wounds having united without accident, and the pupils being clear.

Thirty-two cases have been completely successful, the patients being able to read ordinary print. Four cases are partially successful, slight obstructions of the field of the pupil preventing perfect vision; but in all of these complete success will doubtless be obtained by slight secondary operations. In two of the remaining four cases of failure a most unfavourable prognosis was given previous to the operation, on account of irido-choroiditis from which the patient had suffered, and for which he had undergone iridectomy. In one of the other cases the patient insisted on going home a few days after the operation, returning some time after with occlusion of the pupil and obliteration of the anterior chamber by displaced iris, though the corneal wound had united well, and this structure continued clear. In the other case the cornea assumed a sloughy look on the second day, perhaps, I feared, on account of dampness of the room occupied by the patient. In no case have any unfavourable symptoms beyond, in some cases, a slight irritation, arisen, which could possibly be ascribed to the suture, and it has seemed to me that the healing of the wound has been accelerated and hernia of the iris prevented by its use, thus securing obvious and important advantages, and shortening the *critical* period, as well as abridging the whole term of treatment. A tabular report of the cases is appended to the paper, and shows results as follows:—

Perfect success	80 per cent.
Partial success	10 ,,
Failure	10 ,,

(We hear from American sources that there can be no question about the success which attends the corneal suture in the hands of Dr. Williams himself; but that most other operators have found the difficulties of its application to be so considerable that they have been deterred from perseverance in their attempts. It is inserted by Dr. Williams at the summit of the flap, by means of a very short needle and an ingenious needle-holder, both specially devised for the purpose. The table shows that,

in the cases above referred to, the suture has been removed as early as the sixth, and as late as the thirty-fifth day.)

TUMOUR OF EYEBALL SIMULATING GLAUCOMA.

Dr. Morton, of Philadelphia ("Trans. of Amer. Ophth. Soc.," 1869), mentions an instance in which the symptoms caused by an intra-ocular tumour were mistaken for those of glaucoma. J. G., æt. 41, was admitted into the Wills' Ophthalmic Hospital in February, 1866, suffering from what was taken to be glaucoma. In March, 1865, he discovered accidentally that he was wholly blind of the left eye. No trouble of any kind occurred until the month of May following, when pain gradually came on, and soon became a prominent symptom, which increased to such an extent that he was obliged to give up all work. The pain was most severe at night, and the globe felt as if it would be forced out. On admission, there was complete opacity of the lens, the pupil was irregularly dilated and altered in colour, a great amount of venous congestion, extreme tension of the ball, no perception of light, and pain almost constant, referred principally to the globe and back of the head. The disease was thought to be glaucoma, and iridectomy was performed. Two weeks later, there being no relief, but rather an aggravation of the pain, the eyeball was extirpated. On making a section of the globe, a pediculated, soft, white tumour was found, which sprang from the fundus, about two lines from the optic papillæ. The tumour occupied about one half of the "posterior chamber" (*sic*) and was encephaloid in its character. The optic nerve was uninvolved. With the removal of the eyeball there was an entire relief of all pain, and no return of the disease since.

SYMPATHETIC OPHTHALMITIS.

Dr. Holmes, of Chicago ("Trans. of Amer. Ophth. Soc.," 1869), read before the Society an abstract of the history of forty-six cases of injury or disease of one eye, in fourteen of which total loss of vision in the second eye occurred from sympathetic ophthalmitis, apparently from neglect or ignorance of the physician in attendance; and in thirty-two of which extirpation was deemed necessary by Dr. Holmes to prevent the loss of the other eye. In twelve of the cases of total blindness the sympathetic inflammation occurred at periods after the primary lesion, varying in length from four and a half weeks to ten months; in one case the patient was permitted to suffer fifteen years from severe and frequent paroxysms of pain in an injured and useless eye, when the other eye became inflamed and atrophied. In one case, soon after a piece of metal had been thrown

into an eye, the second eye became inflamed and atrophied, vision being totally destroyed, and yet the subsequent removal of the foreign body was followed by quite good vision in the injured eye. Extirpation was performed in twenty-seven cases, less than six months after the primary lesion. In two cases of choroidal tumour, and in two cases in which a piece of metal had entered the globe, it was performed after the patients had suffered great pain almost constantly for two years. In one case a piece of percussion cap in an eye had failed to produce sympathetic ophthalmitis, although the injured eye was the seat of constant pain or tenderness on pressure for seven years. In a large proportion of these cases the retina was detached from the choroid and situated in the central portions of the globe, either as a solid chord or as a floating membrane, in form not unlike an umbrella partially open.

USE OF ATROPINE IN GLAUCOMA.

Dr. Haskett Derby, of Boston ("Trans. of Amer. Ophth. Soc.," 1869), records two cases of acute glaucoma, in each of which the instillation of atropine was directly followed by the outbreak of the violent symptoms—a development of disease that in the one instance had lain dormant, in the other had not even been suspected. He refers to a warning given by Mr. Wharton Jones ("Med. Times and Gaz.," vol. i, pp. 111, 112), against the use of belladonna in glaucoma, and wishes to direct the attention of ophthalmologists to the question, *whether the use of mydriatics may occasion an excess of acute glaucoma in an eye already predisposed to the same?*

The facts adduced by Dr. Derby throw little light on his problem. In the first case glaucoma had been threatened for two years, and in the second the left eye had already been destroyed by it, and the right displayed "marked venous," although, even under pressure, no arterial pulsation. In the face of clear predisposition to the disease, it seems unnecessary to regard its outbreak soon after the use of atropine as other than a mere coincidence, especially when regard is had to the known effect of the drug in diminishing tension. Dr. Derby very rightly observes, however, "So important in glaucoma are the early ophthalmoscopic symptoms, such as slight changes of level at the edge of the papilla, and particularly arterial pulsation, and so frequently does it become desirable to dilate the pupil in order satisfactorily to determine their existence, that any facts tending to show the impropriety of the use of mydriatics would have a most important practical bearing."

CASE OF ACQUIRED ASTIGMATISM.

Dr. Pomeroy ("Transactions of the American Ophthalmological Society," 1869), relates a case of acquired astigmatism. The patient, æt. 38, was an artist, and complained that for about five years objects had appeared elongated and indistinct, and that he was unable to use his eyes long at a time without pain. The difficulty was so great as to cause him to give up portrait painting. Previously to this affection he had been in the habit of taking sketches of places, and of testing their accuracy by comparing them with photographs, so he feels sure that his eyes were perfect at this time. He first noticed the difficulty after painting miniatures for some time by the aid of an imperfect convex lens. His vision was = $\frac{1}{2}$, but a — 15 cylindrical lens in the vertical meridian raised vision to 1, and enabled him to read No. 1 of Jaeger at $3\frac{1}{2}''$. With these glasses he has worked for more than a year, sometimes using them twelve or fifteen hours a day without pain to the eyes. There is still a little dancing of the lines in Green's plates, when the head is tilted from side to side, but no more perfect correction seems to be attainable.

FLEXIBLE LACHRYMAL PROBES.

Dr. Williams, of Boston ("Trans. of the Amer. Ophth. Soc.," 1869), exhibited to the Society a set of flexible probes for the lachrymal passages. He thinks that Bowman's probes, if not bent so as precisely to correspond with the direction of the duct in the individual operated upon, often lacerate the mucous lining of the passages, causing pain and hæmorrhage, and retarding the cure by causing local inflammation. He has found in practice that his flexible probes adapt themselves to the sinuosities of the passages, can be introduced with more facility and less pain, and are less likely to take a wrong direction. They have bulbous extremities, of the sizes of Bowman's series, but are slender for one third of the distance from the bulb to the flat disc in the middle. They are of alloyed silver, and have an elastic flexibility without being liable to bend upon themselves in encountering obstructions, as would be the case if the silver were pure.

LEADEN STYLES FOR LACHRYMAL PASSAGES.

Dr. John Green, of St. Louis has contributed to the "Trans. of the Amer. Ophth. Soc.," 1869, a paper on the use of leaden styles in the treatment of disease of the lachrymal sac. He says: "Metallic styles, worn for a longer or shorter time

in the lachrymal sac and nasal duct, have long been used in the treatment of obstructions of those passages. Of modern surgeons, Dr. E. Williams of Cincinnati, has employed this method with the greatest success. He uses styles of about eight sizes, ranging from ·035 to ·12 inch, or from the size of No. 3 of Mr. Bowman's series to a diameter of about double that of No. 6. The styles are of silver, and are introduced through an opening into the lachrymal sac made by slitting up the upper canaliculus with a fine pair of scissors. He begins with a style as large as can easily be inserted, changing to larger sizes as fast as the state of the parts will permit. During the whole course of the treatment the style is frequently removed, and the sac and duct treated by astringent injections. The results are extremely satisfactory, both as regards the time required and the ease and certainty with which the case is conducted to a successful issue, and the method is especially adapted for the worst forms of obstruction, such as traumatic or complicated cases. Experience has shewn, however, that it is necessary to use styles of large diameter, in order to guard against relapse. This seems to arise in part from the silver styles being too rigid to accommodate themselves to the direction of the duct, so that they exert unequal pressure on its bony walls. The style, instead of lying loosely in the middle of the canal, is, in fact, making constant pressure upon a few points, so that it tends to produce ulceration of the lining membrane, and partial absorption and ultimate change of form of the bony walls. The canal must, in short, be brought into the form of a strictly cylindrical tube before the style can begin to distend it uniformly, and to exert that equable pressure upon the mucous membrane that is essential to its beneficial action. Reflecting upon the mode in which the curative effect of the styles was attained, the writer was led to the conclusion that the period of treatment might be materially abridged, with increased comfort to the patient, by the substitution of flexible styles of lead for the rigid ones of silver. The experiment was tried upon a very unpromising traumatic case, complicated with abscess of the sac, and with a result so gratifying as to lead to other trials which have all proved highly satisfactory. The apparent advantages of the method are briefly these :—

1. The leaden styles with the maximum degree of comfort, and with the minimum degree of risk from unequal pressure.

2. Under their use the discharge from the sac soon becomes mucous and rapidly disappears, without medication of the sac by syringing or otherwise.

3. A less degree of dilatation, by the use of a smaller size of style, answers for the completion of the cure, thus enabling us materially to abridge the period of treatment.

4. The toleration of the style and the favourable progress of

the cure, without further treatment, enable us, in certain cases, to dispense with the assiduous attention which is so essential with other methods. The plan works particularly well, therefore, in cases, where patients are irregular in attendance, and where, for any reason, but a short time can be spared for treatment.

The styles used have been made from the purest and softest lead drawn into wire, of sizes ranging from one to two millimetres ($\frac{1}{24}$th to $\frac{1}{12}$th of an inch) in diameter. These sizes correspond in the lower numbers to Nos. 4 to 6 of Mr. Bowman's probes. In the larger sizes the maximum (No. 6) of Mr. Bowman in the ratio of 2 to 1·3. They are smaller than the maximum sizes used by Dr. Williams, in the ratio of 2 to 2·9; and they are probably smaller also than the largest styles which he commonly employs. Larger sizes, ranging from two to three millimetres in diameter, have not as yet seemed to be needed.

To make the styles from the leaden wire, it is cut into lengths of two inches for the upper canaliculus; if intended to be passed by the way of the lower canaliculus, they should be about a quarter of an inch shorter. One end of the style is carefully rounded with a penknife, and smoothed by scraping. They are made perfectly straight, as they are more easily introduced in this form: the upper end is bent over into a hooked form by means of forceps, after the style is placed in position. The smaller sizes are introduced with great difficulty, unless a way has been prepared for them by wearing a rigid style of silver for a few hours, or perhaps for a day or two. After this there is no further trouble in exchanging the old style for the next larger, provided only that we take care to introduce the new one immediately upon the withdrawal of the old. The largest sizes (of from two to three millimetres in diameter) if used, will be found rather heavy, they should therefore be drawn in the form of tubes, instead of solid wire. The smaller sizes might also perhaps be made tubular, and their introduction facilitated by passing a fine steel wire into the cavity. Where elegance is an object, the styles may be easily silvered or gilt.

CURE OF SEVERE NYSTAGMUS BY DIVISION OF MUSCLES.

Fano ("Union Medicale," 15th September, 1868), describes a case of severe nystagmus. The patient, a man æt. 27, and employed on the Railroad de l'Ouest, was struck on the right shoulder by the buffer of a waggon on the 20th of March. The blow produced a dislocation of the arm, which the patient reduced himself. From this time his vision began to suffer, and he came to Fano on the 18th of April. He complained that he could not read more than one line of a printed page without being

compelled to stop, because the characters became obscure and the words appeared to be joined together. The acuteness of vision had not suffered. On directing the patient to look straight before him, both his eyes were seen to be in constant oscillatory movements of two kinds, the first being to and fro, from within outwards and from without inwards, the second consisting of movements of the globes about their antero-posterior axes. These two kinds of movements succeeded each other in a rythmical manner, but never happened together, so that there would be first a lateral and then a rotatory movement—both eyes always performing the same at the same moment. An ointment with valerian was rubbed into the orbit, and later the pills of Miglin were administered, but without any favourable result.

On the 15th of June, the internal rectus of the left eye was divided in its muscular portion, and the eye immediately deviated outwards. The patient was ordered to apply cold compresses over the eyelids, and in order to prevent too pronounced a divergent strabismus, to look as much as possible towards the right whenever the eyes were opened during the renewal of the dressing.

On the 19th the lateral movement was less apparent than before when the patient looked straight before him, but was conspicuous when he looked to the left. The left eye remained divergent, and the efforts of the patient could scarcely bring it to the inner side of the median line of the orbit. On the 20th the nystagmus of the left eye was manifestly less, and during the following days it diminished more and more. On the 24th the external rectus of the right eye was divided in its tendinous portion. The operation was followed by a deviation of this eye inwards, to such a degree that the optic axes, divergent after the first operation, were again rendered convergent when the patient looked forwards. On the following day the nystagmus had disappeared, and the lateral movements were only seen when the patient looked to the extreme left or right. On the 27th he read, without stopping, six lines of No. 7 of Jaeger's types. On the 4th of July there was no longer any strabismus, whatever was the direction of the eyes, and the nystagmus had almost entirely disappeared. The patient could read the whole of a small daily newspaper without stopping.

On the 25th of August the cure remained complete. There was no strabismus, the ocular movements were perfect, and although there was still a slight oscillation about the antero-posterior axis, this disappeared during reading, which was attended with no difficulty.

CASES OF INJURY TO THE EYE.

Dr. H. Wagner, of Odessa, records the following cases ("Klinische Monatsblatter," Jan., 1869)—

1. A schoolmaster, æt. 31, had been wounded in the left eye by the discharge of a gun five years previously. In the lens of this eye, close behind the capsule, could be seen a rust brown body, partly concealed by yellowish brown cataractous masses, which formed a sort of halo round the foreign substance. The marginal parts of the lens were perfectly clear. An iridectomy restored good vision, the other eye being amblyopic. Two years and a half after the operation the opacity of the lens had certainly increased, but the marginal parts were still transparent, and the vision was one-fourth of the normal.

2. In an officer who had sustained an injury to the right eye four weeks previously, said to be from a blow on the temples, and in whom the consequent inflammation had already been reduced by frequent blood-letting, there was a small scar in the inner and upper quarter of the cornea, and corresponding to it a circular hole in the iris. In the lens, near to the posterior capsule, a roundish, black substance, scarcely a millimetre in diameter. In the anterior capsule no scar was visible. There was no opacity of the lens, but shreds of flocculi in the vitreous, and vision was only $\frac{1}{30}$. After six months there was still no trace of opacity of the lens, not even in the vicinity of the foreign body. The flocculi in the vitreous had diminished, and vision had increased to $\frac{1}{3}$rd.

3. In a very feeble woman, æt. 43, who had lost the sight of her right eye two years before by falling into a canal, the form of the eyeball was normal, and the lower and outer quarter of the cornea presented a leucomatous scar. The only trace of the iris was a triangular shred at the upper and inner part; its point united with the scar. There were numerous particles in the vitreous body, but no visible change in the fundus oculi, so that the extreme amblyopia was not explained.

4. A boy, æt. 10, who received a blow on the left eye from an arrow, having a ball of pitch at its head, presented a rupture of the sclerotic by *contrecoup*. The outer half of the lower lid was ecchymosed; and on the upper and inner scleral quadrant there was a wound three millimetres in length, close to the corneal margin. It gaped but little, and choroidal pigment and some vitreous substance projected between its smooth margins. The vitreous was diffusely turbid, but there was no intra-ocular bleeding, and no displacement of the lens. Atropine and a light compressive bandage were applied. In two months the vitreous had so far cleared that the patient could read medium print, and the field of vision was normal. He was then lost sight of.

BINOCULAR DIPLOPIA AFTER CONCUSSION.

Romanelli ("Il Morgagni," 1868), records a case of binocular diplopia in a soldier, who suffered from symptoms of concussion

of the brain in the second degree, in consequence of a wound on the occiput, and a fracture of the temporal bone. In the third week, after subsidence of the more severe symptoms, the patient could only see an object singly at a distance of a few centimetres from the eyes; when it was removed further, double vision occurred, and the horizontal separation of the images increased with the distance of the object. Romanelli attributed the phenomena to some central lesion.

ON CHANGES IN ASTIGMATISM UNDER THE INFLUENCE OF ACCOMMODATION.

By Dr. Dobrowsky, of St. Petersburgh (*Arch. f. Ophth.* xiv, 3).

The author shows, partly by fully detailed cases of astigmatism, and partly by experiments on eyes rendered artificially astigmatic by cylindrical glasses, the influence of the ciliary muscle upon the defect. He arrives at the following results :—

1. Astigmatism may be completely corrected by unequal spasmodic contraction of the muscle of accommodation. Hence, it happens that astigmatics do not so much complain of seeing badly, as that they can see clearly for only a short time. They do not see the object in dispersion circles, as would be the case according to the theory of astigmatism, but tire easily, exactly like hypermetropics, who also can for a time overcome their optical defect in near vision by an effort of accommodation. In such persons the astigmatism cannot be detected prior to the instillation of atropine, and the regular myopic astigmatism is, for near vision, a less favourable anomaly than simple short-sightedness, but is, on the contrary, less injurious to distant vision, being capable of correction by accommodation. Inversely, in hypermetropic astigmatism near vision is better, and distant vision worse, than in a simple hypermetropic eye.

2. In consequence of unequal contraction of the ciliary muscle, and irregular curvature of the lens, the astigmatism may be partially but not entirely corrected. This happens chiefly in persons enfeebled by long illness, or tired by prolonged exertion of the eyes.

3. By effort and spasm of accommodation it is possible that astigmatism may be increased. Here, also, it is evident that the actual grade cannot be correctly estimated until the ciliary muscle has been paralysed by atropine. Such patients, when the spasm is relieved, require to change their glasses.

4. By contraction of the ciliary muscle the hypermetropic eye may be so modified as to become apparently short-sighted in one or both meridians. By depletion and the continued use of atropine the spasm may be relieved, and the improper employment of concave glasses may be dispensed with.

5. By irregular spasm of the accommodation eyes that are symmetrical, and either emmetropic, hypermetropic, or myopic, may be made to appear astigmatic.

6. In all cases of astigmatism it is necessary to paralyse the accommodation before deciding whether the defect, or its degree and kind, depend upon the formation of the eyeball, or, partly or wholly, upon some abnormal state of accommodation. It is also possible that other anomalies of refraction may be only apparent, and may be shown by atropine to be astigmatism.

ON THE DIAGNOSIS OF LATENT HYPERMETROPIA.

By Dr. R. Berlin (*Klin. Monatsbl., Jan.*, 1869).

Although the degree of latent hypermetropia may be determined with absolute certainty by the use of atropine, yet the disadvantages of this agent render surgeons unwilling to employ it. The author has observed that latent hypermetropia is rendered manifest when the eyes are brought into parallelism by a pair of abducting prisms. The reasons fully stated in the original, a prism of 6° for each eye is the most desirable. It is necessary first to determine with convex $\frac{1}{10}$ the binocular far point, and then to place before each lens a prism with its refracting angle outwards. The object is then moved farther away, until the details become indistinct. The best object is print of middle size; and its removal beyond the far point, when latent hypermetropia is present, may be carried to 3, 6, 8, or even 12 inches. If there be no latent H, vision beyond the far point is not improved by the prisms. The author promises farther observations upon the subject.

ENTROPIUM WITH NARROWNESS OF PALPEBRAL FISSURE.

Thiry ("Presse Médicale," 1869,) relates two cases of entropium, produced by the combined effect of contraction of the orbicularis and congenital narrowness of the palpebral fissure. The first case was that of a woman, twenty-five years old, who, at the age of fourteen, suffered from inversion of the eyelashes, and since then from repeated attacks of ophthalmia, which, partly through photophobia, partly through corneal opacities, had impaired the sight more and more. On admission both palpebral fissures were much contracted, especially the right; the margins of all four lids were rolled inwards, there was great irritation of the eyeball by the lashes, kerato-conjunctivitis of both eyes, with chemosis of the right; the corneæ turbid, uneven, covered with small epithelial ulcers, and with serous effusions between the lamellæ; continued lachrymation, and photophobia. The external angle of each eye was extended by

incision some twelve or fifteen millimetres; and from this the orbicularis was divided subcutaneously, in all four lids, from the outer to the inner angle. The lids could then be brought into proper position. The margins at the outer angle were separated by pieces of lint, and the upper lids were held up by compresses. In three weeks healing was complete. The left eye was perfectly well, its cornea bright, the movements of the lids easy and regular; but in the right eye the upper lid still required to be freed from some increased eyelashes, and some fasciculi of muscle to be again divided. Complete cure was effected in six months. The second patient, a woman æt. 36, had suffered from earliest childhood from irritation of the eyes. Repeated attacks of inflammation had produced a condition resembling that of the case last described, except that the corneæ had suffered less as regards their transparency. The same operation was performed, and the lids were retained for a fortnight in their proper position by a suitable dressing. The hypertrophy of the conjunctiva was subdued by nitrate of silver, and a complete cure was obtained in eight weeks.

ON THE TREATMENT OF DISEASES OF THE LACHRYMAL DUCT.

By Prof. Ferd. Arlt (*Archiv. f. Ophth.*, xiv, 3).

In this paper the distinguished Vienna Professor gives a minute and detailed account of Mr. Bowman's method of using probes for dilatation, and expresses the belief that this method is sufficient to effect a cure in most cases. Where it fails to do so he incises and cauterises the sac, in preference to using any means to obtain a greater degree of dilatation than Bowman's probes will afford. He even states that the dilatation produced by number 5 or 6 is neither necessary nor free from danger; and he grounds this statement on the fact that a portion of the canaliculus must always remain undivided, and that the natural calibre of this portion will not admit a larger size than No. 4 without injury to its epithelium or even laceration of its wall. The effect of such injury or laceration is to produce contraction, or even adhesion, as healing occurs, so that the canaliculus that freely admitted No. 6 becomes after a while totally impervious.

THE HISTOLOGY OF TRACHOMA.

By Dr. Wolfring, of Warsaw (*Arch. f. Ophth.* xiv, 3).

The author first gives an account of the structure of the normal conjunctiva, on which his views differ in many points from those of other authors.

The so-called papillæ are not formations analogous to the actual papillæ, such as are seen in the mucous membrane of the mouth, but are produced by the tarsal conjunctiva, being marked in all directions by grooved channels, or being irregularly folded. In the furrows thus formed there are numerous depressions, which may be regarded as tubular prolongations of the mucous membrane. At the margins of the lids, where the thin conjunctiva is very closely adherent to the tarsus, these furrows are very numerous and very shallow; upon the tarsus they are less numerous, but deeper; and at the point of reflection they pass gradually into those deeper furrows which are characteristic of the appearance of the conjunctiva of the sac. The elevations enclosed between the furrows form, therefore, the papillæ; and these, which are scarcely perceptible at the free margins of the lids, are more evident towards the angles of the eyes and towards the reflection of the conjunctiva. In new born infants and children the grooves and elevations are very little developed, and their common presence in adults is probably due to the circumstance that the conjunctiva, where it possesses a looser tissue, and is less firmly united with the tarsus, is more at liberty to swell. From the texture of the tarsal cartilages brush-like prolongations of tissue pass into the above described elevations. The vascular capillary network, as well at the bottoms of the furrows as at the tops of the elevations, is "apparently" equally distributed and arranged; yet the author only half concedes the appellation "papillæ" when he declares that every elevation must have its proper arterial branch, but in such a way that its capillary net communicates uninterruptedly with that of the furrows.

The epithelium of the conjunctiva is described by the author as cylindrical epithelium, which, in its most superficial layers, has received a flattened form from pressure. The deep layers possess none but round cells. The cylinder form is least recognizable in the furrows and in the folds of reflection. The cylindrical cells are so quickly shed that they can only be studied in perfectly fresh preparations; and hence this layer has been overlooked by many observers.

The blood-vessels proceed from the external and internal palpebral arteries, which, increased by branches from the temporal and zygomatic regions and the cheeks, form the superior and inferior palpebral arches. The arch of the lower lid courses near its lower margin, that of the upper lid one or two millimetres from its free margin. The latter, however, gives off a branch at each angle of the lid, which meet to form another arch immediately along the convex margin of the tarsus. These vascular arches, and their principal branches, lie near the cutaneous surface of the lids; and from the principal branches proceed, besides those to the skin and the muscles, twigs to the glands

of the tarsus, and others that perforate the cartilage to reach the conjunctiva, and particularly its papillary elevations. The twigs are thicker the nearer they are to the convex margin of tarsus. The capillaries of the conjunctiva, together with those of the posterior surfaces of the tarsal glands, unite to form a close network of fine veins, which lies between the cartilage and the conjunctiva. This network discharges its blood into branches lying parallel with the meibonian glands, and proceeding to the convex margin of the cartilage, where they unite to form two arches, which correspond to the second arterial arch of the upper lid, and to the single arterial arch of the lower lid.

The pathological changes of the conjunctiva are not specifically different forms of disease, but depend upon essentially similar processes, that proceed step by step from overfilling of the vessels to œdematous swelling, to infiltration of the tissues with elements of lymph, to increased secretion from the mucous surface and its glands. The author uses here almost the same words as Stellwag, without, however, quoting him; and employs also his names for the different forms of trachoma. He has proved experimentally upon animals that in simple catarrhal inflammation the white corpuscles of the blood escape into the conjunctival tissue, and are ultimately discharged with the swollen epithelium in the form of pus cells. If the inflammation be more severe, and of longer continuance, the vessels become hypertrophied, and the conjunctival tissue is converted into an adenoid structure by deposit of lymphatic bodies. In papillary trachoma the papillæ become actual swellings, the lymphoid cells in which make them appear like the solitary follicles of the intestinal canal. In mixed trachoma these roundish collections of lymphoid bodies are still more increased, and enclosed between the coalesced papillæ. The largest trachomatous granules are found near the deeper margins of the cartilages, but they are in no way distinguishable, except by the accumulation of their elements and their greater elevation, from those that are scarcely visible to the naked eye. Generally the granules appear first to come into existence when the most acute stage of inflammatory hyperæmia has passed away. It is well known, also, that when the swelling and redness have entirely disappeared, the infiltrated spots become visible as yellowish granules, which may continue unchanged for years, even when the rest of the conjunctiva has become completely normal.

Different from this is the bladder-like trachoma granules, which, when punctured, give exit to a little fluid containing lymph corpuscles, and collapse. These become developed as it appears, primarily, or as a consequence of hyperæmia of a single vascular twig, which may very well pass unobserved by the patient. In these cases there is probably some especial predis-

position. Such granulations may either quickly disappear, or they may themselves become sources of irritation, or they may give rise to swelling of the papillæ, and to the other forms of trachoma. They are distinguished from the harder forms of trachoma granules not only by their position immediately beneath the epithelium, but by containing serous or gelatinous fluid, in which lymphoid elements are mingled only in small proportion.

The fully formed trachoma granules or follicles are usually, but not always, separated from the surrounding textures by some concentric layers of connective tissue. They are surrounded by larger vessels, especially on their tarsal aspect, but their interior is only sparsely penetrated by capillaries.

Whether these granules, when fully formed, become connected with the lymphatic vessels, the author has not been able to determine, since he has not succeeded in injecting the lymphatic vessels of the human eye. In dogs, however, in which trachoma is regularly present on the inner surface of the nictitating membrane, each granule is clearly surrounded by lymphatic vessels, and since the similar formations in the intestinal canal are certainly in relation with the lymphatic system, it may reasonably be believed that in trachoma of the human eye, a similar communication must exist.

UNUSUAL TOLERATION BY THE CORNEA OF THE PRESENCE OF A FOREIGN BODY.

Dr. Voytits ("Wien. Med. Presse," 1868), describes the following curious case:—

A strong healthy boy fell with his face upon a thistle and, besides some slight grazing of the skin, received an injury to his left eye, which he kept half closed. Examination discovered a thin straw-yellow spine, a millimetre and a half in length, from the calynx of *carduus benedictus*, stretching by its base in the outer and lower margin of the cornea, while the point was in the anterior chamber, and directed obliquely upwards and inwards towards the pupil, but without touching the anterior capsule. Beyond slight injection of the conjunctiva, and somewhat increased secretion of tears, there were no symptoms of irritation, and, as the foreign body did not project externally above the corneal surface, and the parents objected to an operation, no attempt was made to remove it. Grey ointment, with extract of belladonna, was ordered to be rubbed into the parts around the eye. Eight days later there was very slight injection of the ciliary region, and very slight greyish turbidity of the cornea immediately around the foreign body. After five or six weeks, when the patient was seen again, no trace of the spine could be discovered, and, according to the statements of the parents, the point had fallen into the anterior chamber after maceration of the

portion imbedded in the corneal tissue. There was a scarcely perceptible opacity, but this, being external to the region of the pupil, produced no effect on vision.

ON THE THEORY OF GLAUCOMA.

By Drs. Magni and Stilling.

Magni ("Rivista Clinica," 1865), and Mazzei (Ibid., 1867), oppose the German theory of glaucoma and propound another. According to the German school, glaucoma is due to an increase of the intra-ocular fluid by exudation from the choroid. The authors object that such exudation, when it occurs posterior to the ora serrata, leads to separation of the retina and to atrophy of the eyeball, but not to glaucoma. If the process be referred to the ciliary region, or, in other words, to cyclitis, we have fresh difficulties arising from the differences between the symptoms of the two diseases. Thus:—

In Glaucoma.	*In Cyclitis.*
The convexity of the cornea is diminished.	Increased.
The iris is atrophied.	Hyperæmic.
The diameter of the eyeball shortened.	Lengthened.
The size of the ocular chambers diminished.	Increased.
The coats of the eyeball thickened.	Thinned.
The crystalline lens diminished.	Normal or enlarged.
The ciliary processes atrophied.	Hyperæmic.
The vitreous condensed, firm.	Fluid, almost watery.
The papilla excavated.	Normal.
The ciliary nerves atrophied.	Normal.

In the presence of these differences it is scarcely possible to assume a similar pathogenesis for the two diseases, which resemble each other only in the single point that in both there is a venous stasis in the retina.

The tension of the ocular capsule in glaucoma is explained by Magni as a result of its contraction (*stipamento*), from which it follows that the intra-ocular fluids must be diminished, and that the vitreous humour must be condensed by loss of its serum. Moreover, the atrophy of the ciliary body, on which the normal quantity of the intra-ocular fluid depends, permits a decrease of this fluid to be expected.

According to v. Graefe's theory, the excavation of the papilla is due to the pressure of the increased fluid upon the lamina cribrosa. This texture, according to Magni, is neither elastic nor extensible, and has a more considerable thickness than that of the fibrous capsule of the globe itself. Why is there no excavation in pronounced hydrophthalmus? An excavation from pressure must necessarily have the form of the letter U or V; while in glaucoma, according to Magni, the papilla assumes the form of a truncated cone, with its smaller extremity directed towards the vitreous.

Magni believes that atrophy of the ciliary nerves affords a complete and sufficient explanation of the course and the changes of glaucoma. By such atrophy the secretory function of the vascular membranes of the eye is diminished, and in the degree that this diminution occurs, and that the vitreous becomes more dense and less bulky, the sclerotic must contract to follow the diminution of its contents. In this way the sclerotico-choroidal foramen, that embraces the optic nerve, becomes much shrunken and drawn in, especially at its inner portion, by which the peculiar form of the glaucomatous papilla is fully explained.

According to Magni, therefore, glaucoma is a chronic disease, depending upon gradual atrophy of the ciliary nerves. The acute glaucoma of v. Graefe is only an already existing glaucoma, complicated by acute choroiditis. The excavation is always accompanied by atrophy of the nerve; and it is difficult to conceive how an inflammation could render the nerve atrophic in a few hours, if it had not been so before. Moreover, there are many cases of acute serous choroiditis without excavation, in which the symptoms in no way differ from those of the cases in which excavation is present. The iridectomy may relieve both the choroiditis and the glaucoma; but since we have as yet only ingenious hypotheses by which to account for its action, the results of treatment cannot afford any test of the correctness of the theory.

Dr. Stilling, of Cassel ("Arch. f. Ophth.," xiv., 3), attributes the occurrence of glaucoma to an inflammation of the vitreous of a serous character. He does not see how the pus elements in the vitreous can be derived from the stroma cells of the choroid, or the increase of the fluid of the vitreous from a serous choroiditis. It is necessary to assume two forms of plaster, and two of serous choroiditis; the products of one form penetrating through the retina and hyaloid, the other leading to detachment of the retina. As positive evidence of the possibility of inflammation of the vitreous body, Stilling advances new facts with regard to its membranous structure. He repudiates the idea that it is a formless mucous mass inclosed in a structureless membrane: and by a special mode of preparation with a solution of carmine he has obtained evidence, to the naked eye, of a

fibro-membranous scaffolding in the fresh eyes of mammalia. The somewhat eccentric canal that passes through the vitreous from the papilla to the posterior surface of the lens, may be easily rendered visible in the eye of a pig. The vitreous and lens being lifted together from the eye, the lens removed, and the vitreous turned over in sufficient water to immerse it to half its height, a drop of carmine solution must be placed in the clearly visible funnel-shaped space at the posterior pole. The canal will sometimes fill itself immediately up to the anterior pole, although at other times the vitreous must be somewhat turned and moved before the experiment will succeed. If more water be then added, and the whole vitreous allowed to float, the reddened canal will be clearly visible through the transparent parts around it. It is possible that the projection forwards of the lens, and the excavation of the papilla in glaucoma may be due to this canal being overfilled with fluid.

GUNSHOT WOUND OF THE ORBIT.

M. Worms ("Gaz. des Hôp.," 1868,) relates the case of a young man to whom he was called at half-past eleven in the morning. The night before, about midnight, the patient had gone to his bedroom under the influence of wine, and had discharged a pistol at his own head. He remembered only vaguely what had happened afterwards, but believed that he went to bed and slept until morning. He awoke covered with blood, and called for assistance.

M. Worms found a bullet wound, a centimetre and a half in diameter, two centimetres external to the outer margin of the orbit, and in the line of the superciliary ridge. The margins of the wound were slightly swollen, and were blackened by powder, and the outer portion of the eyebrow was burnt. The face, neck, and ear were covered by blood, which had also entered the ear of the other side; but a careful examination showed that this bleeding was only what had flowed from the external wound. A probe, carefully introduced into the wound, passed for six centimetres in a direction perfectly horizontal, but oblique from before backwards, in such a way that its prolongation would have reached the opposite side in the axis of the mastoid process. The probe admitted of a little lateral movement, and the exploration revealed the following conditions:—At a depth of two centimetres the probe discovered a cavity of denuded bone, and by tracing its margin showed its form to be nearly circular. Deeper still, at four centimetres from the surface, there was a little fragment of bone, to the right and left of which the probe could pass. Lastly, at the bottom of the wound there was a moveable foreign body. This was of the

bulk of a small leaden bullet; but, instead of being spherical, it presented on the side towards the wound a sort of longitudinal crest, with a little groove along its base. This foreign body was easily extracted by dressing forceps, and was found to be a pistol bullet weighing 750 grains, and 1·2 millimetres in diameter. It was flattened at one of its poles, and presented at its outer surface a gaping fissure, as if an attempt had been made to divide it with a strong knife. The extraction was followed by no symptoms of inflammation, no cerebral or ocular disturbance, and no ecchymosis under the sclerotic. Ophthalmoscopic examination showed no changes, and the movements of the pupil and of the eye were unaffected, except for a very slight impairment of the action of the superior rectus, so that the extreme rotation upwards was about two millimetres less than on the other side. A small degree of inconvenience on opening the mouth, probably caused by a laceration of the temporal muscle, was the only evident effect of the injury. The healing of the wound was retarded by an attack of erysipelatous inflammation, and by the escape of fragments of bone, but cure eventually took place.

NOTES OF VARIOUS OPHTHALMIC CASES.

(*By Jonathan Hutchinson.* "*Medical Mirror*," *Sep.* 1, 1869.)

Case 1.—Retinitis Pigmentosa. History of many Relations affected in the same manner.

Case 2.—Pain in the Ear and in the Teeth, caused by an inflamed Eye.

Case 3.—Syphilitic Paresis of Certain Branches of the Third Nerve, inducing Loss of Accommodation, &c.

Case 4.—Insidious Glaucoma at an Early Age in a Patient who had never Menstruated, and in whom other peculiarities existed. Premature senility.

Case 5.—Double Neuritis, preceded by severe and persistent Neuralgia in Left Side of Face.

We record the headings of these cases, in order to supply means of reference to any interested in the subjects which they illustrate.

A CASE OF NIGHT BLINDNESS FROM WORMS IN THE INTESTINAL CANAL (?)

Dr. Leedom, of Plymouth, U.S., records a case under this title in the "American Journal of Medical Sciences;" but, as is usually the fact, the details are too scanty to carry conviction to most.

A boy of seven years of age was able to go to school, and could see well during the daytime: but as soon as night came his eyesight failed, so that he could not discern objects. He would run against tables, chairs, and other things, and that it was dangerous for him to move about, and his father was afraid that the boy would become totally blind. The boy was sturdy and robust; his eyes presented no peculiarity. When taken to the window, possibly the pupils did not contract quite so much as they should have done. An anthelmintic was ordered him, as he was said to be troubled with worms. A great number, some of them of large size, were discharged, and afterwards his eyesight became quite restored.

A BINOCULAR STRABISMOMETER.

M. Béclard has presented to the Academy of Medicine of Paris a very ingenious and simple little instrument, invented by Dr. Galezowski, a binocular strabometre. It is composed of a horizontal branch, upon which slide two needles, destined to indicate the degrees, and which are placed opposite to the centre of each corresponding cornea. The bar is held by a handle on a level with the eyelids, and the middle resting on the root of the nose. By turning buttons at either end of the bar, the needles are moved to and fro till they correspond with the centres of the pupils. Any deviation during squinting can then easily be read off.

HERPES FRONTALIS.

(*By J. B. Scriven, Principal, Lahore Medical School.* "*Indian Med. Gazette,*" *July* 1, 1869.)

This case was an extensive one, and presented several points of interest.

The eruption affected the side and tip of the nose, but the eye was only slightly inflamed; only a single phlyctenule occurred on the conjunctiva, and the cornea was slightly hazy.

There were some vesicles on the cheek and upper lip, showing that the second division of the fifth was implicated.

Two or three vesicles occurred on the lower lip, from a similar affection of the third division of this nerve.

The pain which followed the healing of the eruption was slight in this instance.

The eruption was preceded by "severe frontal headache" for a few days, and the headache followed several nocturnal attacks of fever.

HERPES FRONTALIS.

(*By Assistant-Surgeon F. M. Mackenzie.* "*Indian Medical Gazette,*" *August* 2, 1869.)

A man cook, æt. 50, showed scars of a severe eruption of herpes frontalis on the right side of his forehead, extending from the root of his nose to the scalp.

None transgressed the median line.

There were no scars on the side of the nose.

There were a few scars on the side of the temple.

The attack of herpes occurred *thirty-three years before;* it was preceded for three months by severe pain in the right side of his head.

He had recovered from an attack of fever just before the pain came on.

The scars were slightly painful for some time after the eruption healed.

FOREIGN BODY LEFT IN THE EYE.

In the western "Journal of Medicine," August, 1869, Dr. Wright relates a case in which a small chip of stone remained in the left eye of a man for eighteen years. After the immediate symptoms had gone off, the foreign body gave no trouble for fifteen years; repeated attacks of inflammation then came on, the vision remaining "tolerably good," and ended in extensive corneo-sclerotic staphyloma, with intense pain and loss of vision. An incision through the sclerotic staphyloma gave exit to the shrivelled lens, but no foreign body was found; the eyeball shrunk considerably, and formed a good stump for an artificial eye. Dr. Wright considered the eye too much inflamed for extirpation when the man applied to him.

SCLEROTITIS IN CONNEXION WITH AN ACHING TOOTH.

The same surgeon gives a case of circumscribed sclerotitis at the outer part of the right eye, accompanied by some aching in the second molar tooth on the same side. Extraction of the tooth was followed by rapid subsidence of the inflammation in the sclerotic; other treatment had no effect till the tooth was removed.

A NEW TEST FOR MIXED ASTIGMATISM.

Mr. Couper describes in the "Medical Times," January 30th, a new test for mixed astigmatism. It consists in seeing—1st, an erect, and 2nd, an inverted image, by making the eye move vertically or horizontally.

CHROMATOSCOPY.

Dr. Wolfe has an article in "The Lancet," February 13th, 1869, giving his clinical experience of the diagnostic value of colour tests in various affections of the *retina*.

In *atrophy of the papilla* the patients at first lose the power of distinguishing the *feeble tints* of various colours; at later stages they become more or less unable to distinguish the principal colours; *red*, especially, appears *grey*, and *green* seems to be *black*.

In "*alcoholic amblyopia*, when the ophthalmoscopic examination gives a negative result," there is a tendency for any colour impression to remain for some time after the eye has been removed from the coloured object, so that a patient after looking at *green* will be unable to distinguish *red* or *orange*, unless he closes his eyes for a few seconds between the two attempts.

It is said that when chromatic perversion exists in cases of *apoplexy of the retina*, it indicates that the deep layers of the retina (especially the rods and cones) are involved.

Dr. Wolfe thinks that chromatoscopy will be especially valuable in cases of *syphilitic choroiditis* with *turbid vitreous*, when it is impossible to diagnose by the ophthalmoscope, whether the *retina* is diseased or not.

If the retina remains unaffected the amblyopia is simply one of degree, and the perception of colours is not impaired, but disease of the retina is always accompanied by impairment of the "chromatic faculty." This, if true, would seem a valuable means of diagnosis.

Dr. Galezowski, who has recently published a book on the subject, localizes the power of distinguishing colours in the *cones*, and he regards each cone as a prism, which produces at its base a concentric circular spectrum by decomposing the ray of white light impinging on its summit. Each zone of colour will impress a separate part of the cone, and as with white light, all the zones will be impressed, the result will be a perception of white light. Dr. Wolfe gives us no further explanation than the above, of the cause of imperfect perception of certain colours by some retinæ. Are we to suppose that colour-blindness is due to an inequality in the perceptive powers of different belts of the cones, whereby some colour of the zonular spectrum is not perceived?

February 20.—Mr. Carter notices Galezowski's book on Chromatoscopy, and objects to the concentric spectrum, because the *bases* (not the *apices*) of the cones are directed towards the centre of the eye.

HEALTHY CHILDREN OF A MOTHER AFFECTED WITH HEREDITARY SYPHILIS.

(*By Dr. Charteris. "Lancet," January 30th,* 1869.)

The woman, æt. 30, had three children; the two eldest were living and healthy, the youngest died during dentition.

The mother had characteristically notched teeth, set angularly to each other, and sunken bridge of nose. She had had double keratitis for six years, the disease being subject to relapses. She presented no signs of struma. She was the elder of two. Her parents were alive.

DIVERGENT STRABISMUS AFTER DIVISION OF INTERNAL RECTI—OPERATION.

Mr. Hulme operated on a case of divergent squint, resulting from previous division of both internal recti.

He divided the left external rectus and brought forward the internal rectus at one operation; subsequently he divided the right external rectus and brought forward the internal muscle, as before, but owing to the previous extreme shortening of the external muscle in this eye, all power of eversion was lost after its division. The tendon was subsequently brought forwards at a third operation, and she obtained in this way good power of eversion and inversion with each eye, but there is a very slight *internal* squint of the right eye; she has, however, binocular vision and no diplopia.—"Lancet," June 12, 1869.

ELECTRIZATION OF PARALYZED MUSCLES IN STRABISMUS.

(*By R. B. Carter. "Lancet," January 2nd,* 1869.)

Two cases are recorded in which a paralyzed rectus was completely restored to power by the primary induced current passed through small reophores applied to the conjunctiva immediately over the affected muscle.

The first was paralysis of the superior rectus without assignable cause, accompanied by diplopia. The inferior rectus was divided after a few days' use of the current to the superior rectus, and the electrization continued. The deformity and the diplopia were cured.

The second was an extreme convergent strabismus from hypermetropia, with amblyopia of the squinting eye. The internal rectus was divided freely with little benefit; but power was restored to the external rectus by subsequent use of elec-

tricity in the same way as in the former instance. The squint was entirely removed.

CARBOLIC ACID IN CONJUNCTIVITIS.

Dr. C. F. J. Lehlbach has used carbolic acid in some cases of conjunctivitis, purulent, acute, and chronic. He thinks there is no local application which can be compared with it in this disease.

FOREIGN BODY PRESENT IN THE EYEBALL FOR A LONG TIME, AND ULTIMATELY REQUIRING EXCISION.

At the Pathological Society, January 19th, 1869, Mr. Spencer Watson showed a wasted eyeball, which he had excised. It had contained a shot for twenty-four years; bony deposit had occurred recently, and probably had caused the sympathetic ophthalmia which necessitated excision.

THE OPHTHALMOSCOPIC DIAGNOSIS OF TUBERCULAR MENINGITIS.

Dr. Clifford Allbutt, in two articles ("Lancet," May 1st and 8th, 1869), shows that many cases of fatal tubercular meningitis are accompanied by changes readily appreciable by the ophthalmoscope, viz., congestion of the disc, and hyperæmia of the retinal vessels, followed by ischæmia of the papilla, and sometimes by neuritis; and he is strongly of opinion that many mild cases of tubercular meningitis occur, which not ending fatally, have hitherto been more or less overlooked or put down as a "trifling illness," but in which the same changes occur in the fundus of the eye, and he asks for a full and careful examination of the eyes in all cases when children have symptoms which, but for their mildness, would seem to indicate meningitis. In only one such case hitherto has Dr. Allbutt verified his diagnosis of past meningitis by a *post mortem* examination; in this case, a child had "obscure head symptoms, suggestive of meningitis," and "ischæmia papillæ" was discovered; he recovered, and the ischæmia partly subsided, but he had a relapse of the head symptoms, accompanied this time by neuritis, and ending fatally. Meningitis, *apparently of two distinct dates*, was found at the base, and the date of the first attack is supposed to have coincided with that of the first onset of head symptoms, and with the occurrence of the change seen in the discs.

Dr. Allbutt speculates as to the probable frequency with which idiocy follows non-fatal tubercular meningitis, and thinks it possible that a good many cases of acquired idiocy really follow this disease, and that this origin for such cases may be made certain, or or least highly probable, by ophthalmoscopic examination.

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